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THE MODEL ENGINEER

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14TH AUGUST 1952 VOL. 107 NO. 2673

SMOKE RINGS

Our Cover Picture

● THE PHOTOGRAPH this week depicts a scene that will be familiar to many readers, for the ever-popular Romney, Hythe & Dymchurch Railway never fails to attract and delight visitors, especially at this time of the year. The photograph, taken by Mr. C. R. L. Coles, shows one of the American type 4-6-2 locomotives, No. 10, *Doctor Syn*, on a train about to leave Hythe terminus.

The Blue Riband of the Atlantic

● THE NEW American liner, *United States*, in crossing the Atlantic in quicker time than ever before, when on her maiden voyage to and from this country, won the approbation of all who take an interest in modern ship design. At the same time, she has aroused hopes that something like the old friendly competition for the Blue Riband of the Atlantic may be revived. At the moment, *United States* has beaten all previous records by a very substantial margin, but we do not yet know the true capabilities of any other liners making that crossing, and most people are awaiting patiently the first indication that the challenge now thrown out by America will be taken up.

Our own *Queen Mary* has recently left dry-dock after a routine overhaul, and there may be some excuse for the idea that the opportunity was taken to put her into the tip-top condition which would be necessary in any liner intending to reply to the challenge. On the other hand, there is no real virtue in speed for the sake of speed; such matters as design of the ship herself, and the economics of pressing her to the utmost limit of her speed capacity, must be carefully considered The question which is exercising the minds of many people today is whether there exists a liner which could equal the record of the old *Mauretania* in holding the Blue Riband, against all comers, for a period of 27 years—1909 until 1936. In the latter year, the famous old ship's speed record was broken by the *Queen Mary*, and there the matter rested until the *United States* shattered it. Can the last-named hold the record for 27 years? We are inclined to doubt it; the design of ships and their power plants is constantly progressing, and there are signs of a speeding-up of that progress in the near future.

"Twin Sisters" Again

● READERS, ESPECIALLY those who are following Mr. J. I. Austen-Walton's "Twin Sisters" series of articles, will be glad to learn that Mr. Austen-Walton is now back home after many weeks in hospital He is still incapacitated physically, but is able to do a certain amount of work at the drawing-board and in the workshop. We hope that he will have no setbacks to hold up the completion of "Twin Sisters."

The "M.E." in Australia

● MR. S. H. MILLIGAN, of the Surrey Hills Live Steamers, Victoria, Australia, when writing to thank us for obtaining a copy of THE MODEL ENGINEER to complete a volume for him, states :

"That completes every volume since No. 72. They are much prized by myself and members of our club. Only last week two new members delved back to the early volumes and are now building *Purley Grange* in 2½-in. gauge. Thank you, everyone, for the marvellous job being done for the model fraternity by your valuable paper."

We are grateful for that kind message, and we reciprocate with our best wishes to the Surrey Hills Live Steamers, especially to the two new members who have started to build *Purley Grange*. It is very interesting to note how popular the Great Western Railway locomotives are almost everywhere.

Can Anybody Help ?

● THIS IS not the first time we have written a paragraph under that question, and we do not mind admitting that we usually do so as a last resort after all other sources of information have failed to help us !

We have received an enquiry from Mr. A. W. G. Tucker, whose splendid examples of "L.B.S.C.'s" locomotives have been illustrated in back issues of THE MODEL ENGINEER and have been much admired for the superb workmanship he has put into them. This time, however, Mr. Tucker is seeking aid in discovering whether there is still in existence a Ferranti steam-driven alternator set. The type he is especially interested in, with a view to its preservation, is the vertical cross-compound type with the alternator direct mounted on the crankshaft, and the cylinders fitted with the four-grid valve arrangement controlled by quick opening and closing cams. These engines date from about the 1900-1904 period and were installed in a number of electricity generating stations throughout the country, as well as at some private plants.

Unfortunately, Ferranti's own records of that period are very sketchy, and there seems now to be no definite information as to where one of these interesting machines might be found. Does any reader know of one ? If so, he is invited to let us know as soon as possible, since we are naturally anxious to do anything we can to facilitate the preservation of such an important example of early generating plant.

C.P.RR's New Vice-President

● MR. J. N. MASKELYNE has just had the honour and pleasure of being elected a vice-president of the Carolwood-Pacific Railroad. There may be some readers who do not know that line, or where it is, for it probably does not show on any map—at least, not yet ; for the C.P.RR. is a beautiful and extensive 7¼-in. gauge layout belonging to someone everybody knows—Walt Disney.

The train consists of a 1½-in. scale reproduction of a Central Pacific locomotive, six gondolas, two freight cars, two cattle cars and one caboose, all of which are of the 1872-1880 period. The track extends to some 2,600 ft., laid out in a scenic pattern of trestles and tunnels along the edge of a canyon wall on a quiet street in Beverly Hills, Southern California, U.S.A.

The locomotive is an exact replica of No. 173 which was built in 1872 at Sacramento, California ; with her "diamond" smokestack, tobacco-jar domes and ornate decoration, the model is typical of American practice at that time, yet she is a powerful little job. She was built by Walt Disney and members of his staff in the workshops belonging to the studio where the delightful Disney films are made. We hope to be able to publish a description of the C.P.RR. and its stock as soon as the necessary pictures come to hand.

A 2-in. Scale G.E.R. 4-4-0

● MR. G. FARMER, of Calne, Wilts, has sent us an interesting enquiry regarding a partly-made 2-in. scale model of the famous Great Eastern Railway 4-4-0 engine *Claud Hamilton*, which he disposed of in 1916, or about that time. This model was described in *The Great Eastern Railway Magazine* in January and February, 1914, and Mr. Farmer would very much like to know what has become of it, and whether the patterns still exist. He was a pattern maker at Stratford when he started it.

Big Wagons

● WE LEARN that the Railway Executive has ordered two of the biggest wagons ever designed for use in Britain. They will be required to carry some of the heavy electrical equipment needed in connection with the extension of the electrical industry.

Each wagon is to have 24 wheels, will be 92 ft. in length and capable of carrying a concentrated load up to 135 tons. Moving electrical transformers of exceptional size and weight will be the principal use to which these wagons will be put. Traversing mechanism will be provided so that the load can be moved to one side or the other of the wagon when passing fixed structures such as bridges, centre girders on bridges, signal posts and the like.

These wagons are being built by Head Wrightson & Co. Ltd., of Thornaby-on-Tees, and are expected to be in service by the late autumn. We are wondering whether these wagons will be any sort of inspiration to owners of model locomotive tracks.

Useful Films

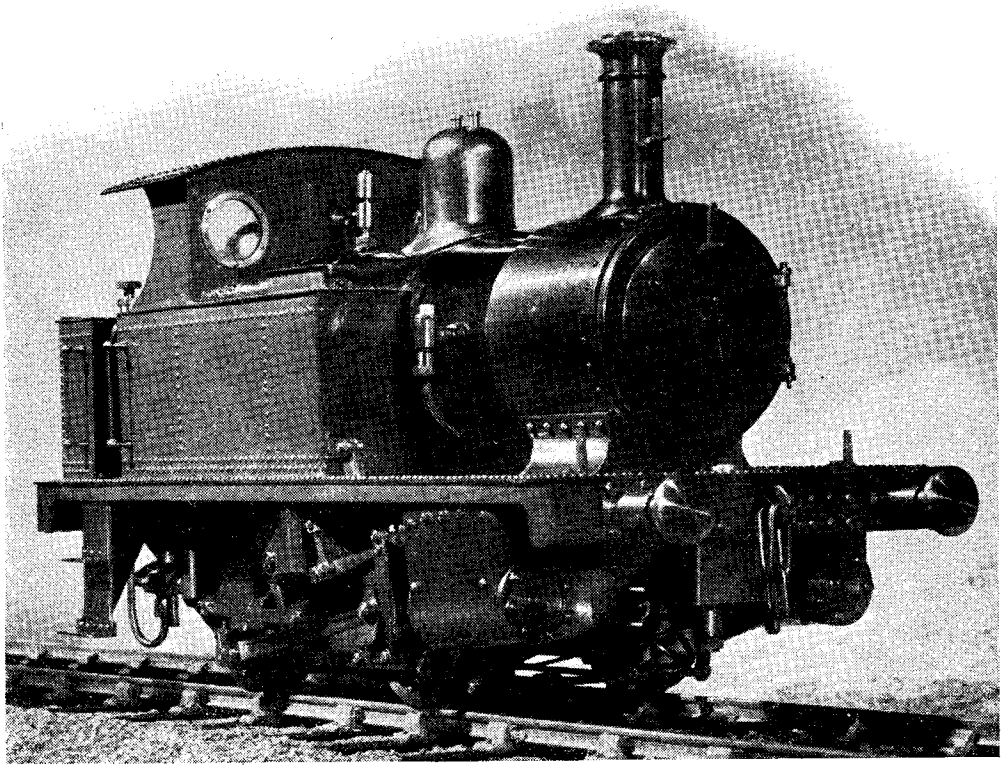
● WE HAVE received from the Petroleum Films Bureau, 29, New Bond Street, London, W.1, a list of films which are available, free of charge, upon payment of return postage. The list runs to thirty pages, and gives brief particulars of 35 mm. and 16 mm. films on such subjects as : Petroleum, aviation, motoring, power, engineering, agriculture and safety-first, as well as film magazines and other subjects.

We think that club secretaries, who are preparing programmes for the winter season, may care to know of these films.

Scottish readers may obtain P.F.B. films from the Scottish Film Office, 16-17, Woodside Terrace, Charing Cross, Glasgow, C.3.

"Tich" de Luxe

by "L.B.S.C."



IT was my original intention to describe, in this week's notes, how to make the cylinder drain cocks for *Britannia*, and the operating gear for same ; but, as Bobbie Burrrrrns once wrote, " The best-laid plans o' mice and men gang aft agley." True enough, when one of Mickey's relations makes plans for a feed of cheese, and gets a broken neck instead, which happened in our kitchen a few days ago ! Anyway, I had the idea of wangling out a small edition of the steam-operated drain cocks fitted to the full-sized engines, and had begun experimenting, when the usual hundred-and-one circumstances intervened, and brought matters to a temporary standstill ; but I won't keep builders waiting a day longer than I can help. Meantime, here is a little diversion which may prove interesting.

A retired automobile engineer in the North of England, wanted to give a present to another old friend in the same line of business, who is still in harness ; and as the latter had learned his engineering at one of the finest schools in the world, to wit, the locomotive works at Swindon, decided to build a small locomotive for him. He had plenty of time on his hands (wish to goodness that applied to your humble servant !) a well-equipped workshop, and the necessary skill and patience for a really worthwhile job of work. The engine he chose was *Tich*, with the larger of the alternative boilers, so he obtained some castings and parts, and got busy. What he did, and how he did it, is shown in the accompanying pictures. I should imagine that of all the hundreds of these little locomotives that have been built, *Pimples* takes the biscuit.

Pleasant Recollections

The builder is one of my oldest correspondents ; not in the personal age sense, I hasten to add, but

in the length of time that has elapsed since he first sent me a letter. That was in the early days of the " Battle of the Boilers," which episode was one of the causes of the beginning of this series of notes. For new readers' benefit I might briefly explain that up to about 1920, the old school of locomotive designers and builders had " ruled the roost," in a manner of speaking, and the spirit-fired—or in some cases, oil-fired—water-tube boiler was deemed to be the " last word," or, in fact, the *only* word, in small locomotive practice. Another " last word " idea was the cylinder with drilled pinhole ports, and no lead to the valve ; the idea of expansive working in small cylinders was " all rubbish." Meantime, I had been doing a bit of lone-hand experimenting, and had made certain discoveries ; and when some letters appeared, relating to the much-vaunted water-tube boiler, I could stand it no longer, chipped into the discussion, and proceeded to blow all the long-established theories skyhigh. What happened afterwards, is ancient history now ; all I need add, is that the builder of *Pimples* chipped in also, on my side, and shared my amusement when our opponents were absolutely and completely routed. Mind you, the water-tube boiler is the cat's whiskers for small toy engines. I have specified this type for gauge " 1 " and gauge " O " jobs, where a long run with coaches or wagons on a " scenic " line is required, and the driver doesn't ride with the engine ; but for really serious work, it is as dead as the dodo.

Valued Service

After the last shot was fired, peace declared, and the new era of the coal-fired locomotive-type boiler had started for locomotives of 2½-in. gauge and upwards, I kept more or less in touch with my ardent backer, and on several occasions he rendered me valued service ; for example, he sent me some easily-workable rustless steel for the valves of the first four-cylinder 4-6-2 that I ever built. In fact, to the best of my knowledge and belief, it was the first of that type in 2½-in. gauge that had ever been built by anyone at all. Incidentally, it is still running, and nearly as old as *Ayesha*. However, time rolled on, as it has a disconcerting habit of doing, and Fate ordained that we shouldn't meet ; it was a long way from Norbury, where I was living, to Northumberland, and my friend had no occasion to come anywhere near my home. In due course, I went across the big pond, and might well have stayed there for the rest of my days, as I had been promised a job as engineer (driver) on one of the American railroads ; but Fate once more took a hand in the great game of Life, and not only caused me to return, but arranged that I should make my future home right alongside the railway on which I once had earned my daily bread. Those of my old L.B. & S.C. Railway fellow-conspirators who were still on the footplate, or running Milly Amp's " glorified trams " as they jocularly called them, chaffed me about this, and said that I loved the old line so much that I would die beside it. That prophecy, made in jest, very nearly was fulfilled during the six years of insane bloodshed and destruction ; on one occasion, an incendiary bomb fell through the roof of the house next door, two feet from the party wall, and the house was burnt to a shell. By the grace of Providence—it was nothing else—we escaped with merely a few scorched rafters, and some cracks in the wall.

It's a Small World !

My stay in the land of dollars and sense, put me out of touch with many old correspondents, including the one mentioned above ; and the popularity of these notes—and with it, the number of new correspondents—had increased so much that I had absolutely no time to rake out old " pen-friends." Time was still emulating Ol' Man River, when suddenly there came a " bolt from the blue " ; truth is ever stranger than fiction. It so happened that one of my correspondents, who was in the motor business, did me a good turn, and in return I invited him to come and have a run on my road. Incidentally, this proved an expensive trip for him ; for some three days after, I found the return half of his railway ticket in the grass near my railway. It had fallen out of his pocket, so I returned it by post, and suggested making a claim on British Railways for refund of the single fare he had paid when he couldn't find his return ticket for home. In the old days, the L.N.W.R., or G.W.R., or, in fact, any of the old companies, would have paid out like a shot ; on several occasions when I took return tickets to some place, even cheap excursions, and somebody gave me a lift home by car (that was before I had a gas buggy of my own) I always got a refund by surrendering the unclipped unused half of the ticket—vot you tink, eh ? Hoots, mon, awa' wi' ye !

An Old Ally

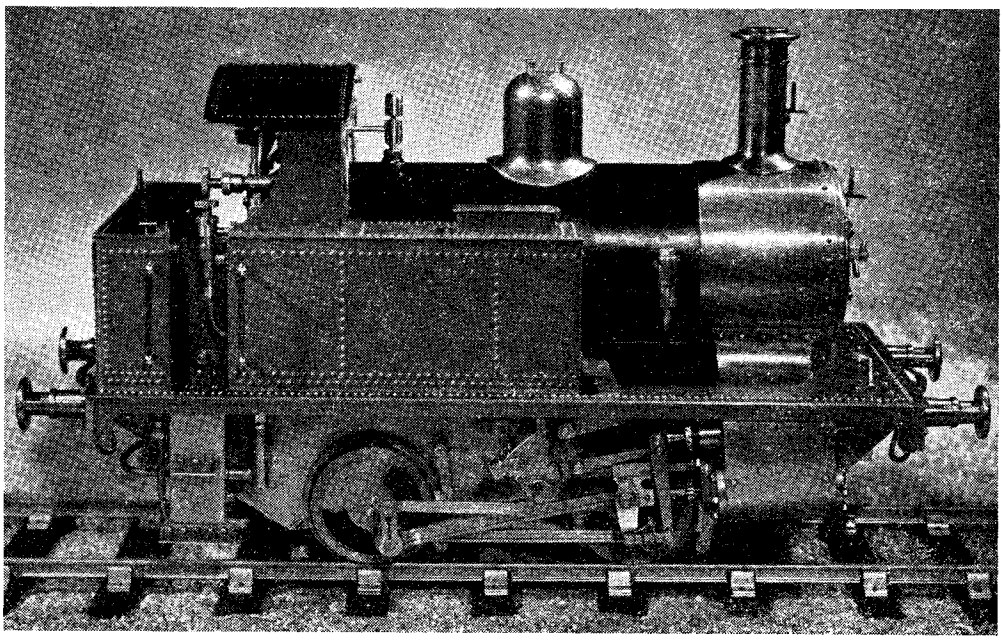
In due course, my new friend said he would like to come again ; and as his boss was very much interested, and had been in the locomotive dept. at Swindon, could he bring him along ? They would come by car, so no more lost ticket antics. I said O.K. ; they duly turned up, and had an enjoyable time. Then the boss started writing to me ; and the lid blew off the kettle when he mentioned that an old friend of his had recently visited him, and they had been talking about me and my locomotives, as the said friend, whom he mentioned by name, was one of my old correspondents—none other than my ally of the " Battle of the Boilers " !

The Birth of " Pimples "

The boss had a yearning for a good locomotive, and tried to prevail on me to let him purchase one of mine ; but I told him they were my kids, and no mum worthy of the name would ever sell her kids. Then he suggested advertising for a used one, but I soon put him off that, by telling him of experiences some of my correspondents had had. It was at this point that his old friend stepped into the breach, and offered to build a *Tich* for him, " for old times' sake " in a manner of speaking ; and so *Pimples* was conceived. The boss gave him my address, and he promptly renewed the correspondence which had, for so many years, been in a state of hibernation. He told me all about the engine, and said he was going to make a real posh job of her, as he had the time, equipment, and patience.

Soon after making a start, he wrote and told me he was coming South for the motor show at Earls Court, and suggested paying me a visit, bringing the bits of the locomotive now under construction, for my inspection and approval. It didn't take me long to okay that ; and in due course, I at long last shook hands with somebody I had known about for thirty years, but had never before seen. I had no trouble in recognising him as I had seen his photograph in a motoring

natured leg-pulling, and I had to have a crack about fitting a wheel-and-screw reversing gear to a type of locomotive that never had such a fitment in actual practice. I can just imagine the flow of railroad Esperanto—a vocal Victoria Falls !—if the driver of a full-sized *Tich* had to " turn the mangle " to reverse, every couple of minutes or less, when shunting little tip wagons on a contractor's job, or in a quarry, or on colliery or factory sidings !



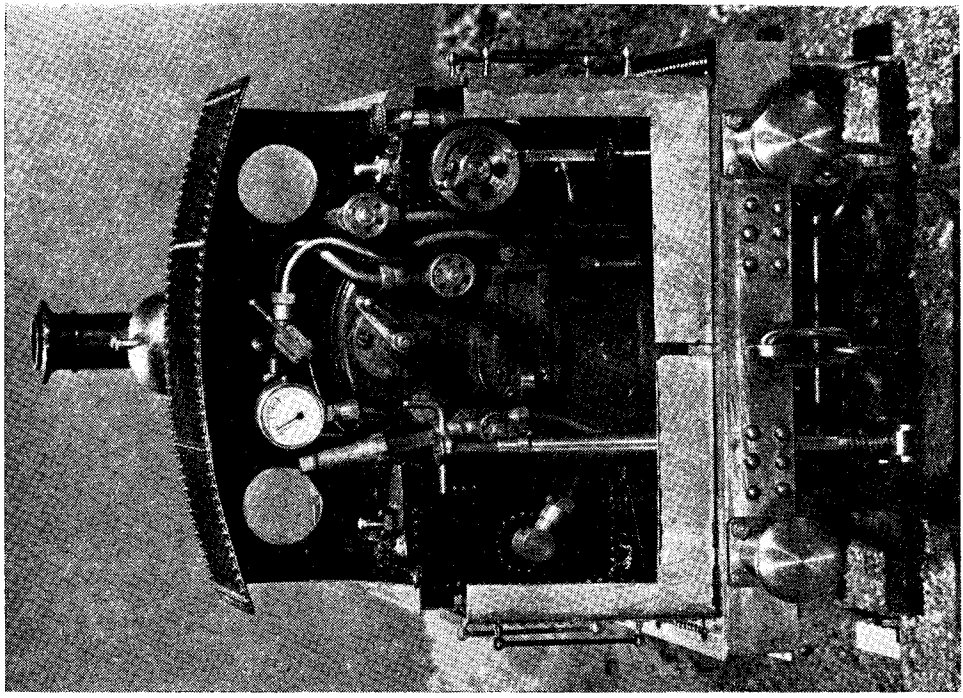
Pimples in profusion !

journal ; and the boss had told him what Curly looked like. We had a pleasant yarn about locomotives, old times, and what-have-you ; and I duly inspected and passed the pieces of the locomotive-to-be that he brought with him. The workmanship and finish of the parts were a very good distant-signal indication of what the finished job was going to look like.

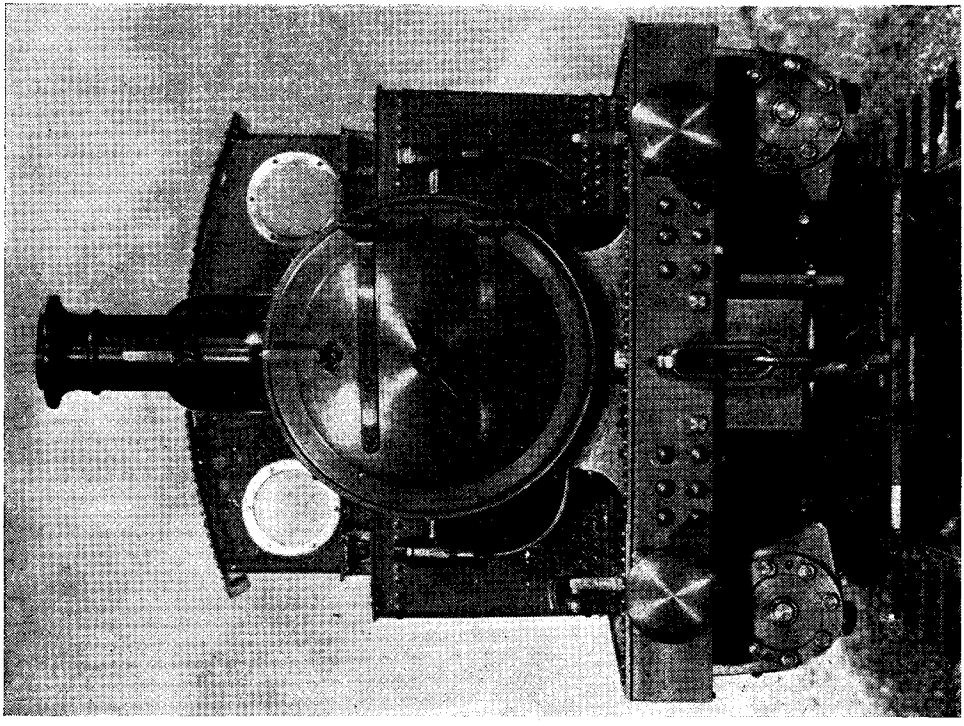
The Engine Grows Up

Our worthy friend duly departed ; and from then onward he kept me informed of the progress of the locomotive, and discussed various things he wished to incorporate, in order to make her a real " de luxe " job. One thing he did was to cut the cylinders from solid blocks of gunmetal, as he wasn't satisfied with the metal in the castings which he had obtained. Extra finish was added to various parts of the chassis, cylinders and motion, such as the fluting in the connecting- and coupling-rods. Hexagon-headed screws and bolts were used, where the specification I set out for our beginner friends, called for round or cheeseheads, for the sake of economy and simplicity. However, Curly wouldn't be Curly if that person didn't indulge in a bit of good-

Then again, our friend didn't like the disc-in-a-tube regulator valve which I specified for the larger boiler ; said he couldn't get it steam-tight. How that came about, I don't know, because none of the discs in the tubes on my own engines ever give any trouble through leakage, maybe because I don't neglect to oil them occasionally, taking off the dome cap and dropping a couple of spots of cylinder oil down the steam pipe. In passing, a word of warning may not come amiss at this point. You can have the valve and portface of any disc regulator (tube or dome) *too well fitted*. In the past, I have known of several cases where a locomotive builder who, like our friend, is an absolutely first-class workman, going to the trouble of lapping and polishing the contact faces until they adhered dry when slid one over the other ; yet the darned thing leaked like old boots after the first run. Why ? Simply because the most infinitesimal scrap of grit, getting between the faces, keeps them apart and lets steam pass ; and they " go hard " and are stiff to operate, even after the first steam-up, because all the oil is squeezed out by the perfect surfaces. My way of fitting contact faces of regulators, slide valves,

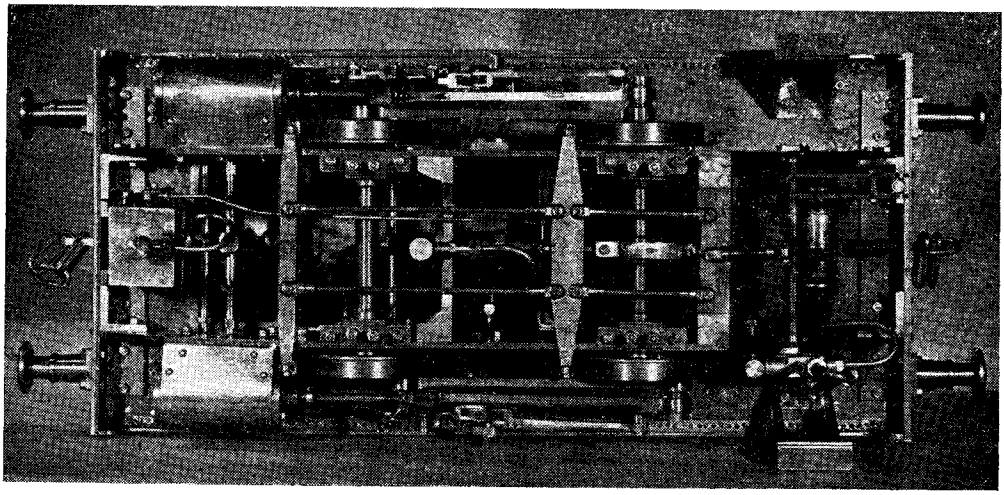


Bunker removed to show footplate fittings



A realistic aspect

etc., is to machine them first, and then rub them lightly on a sheet of fine emery-cloth or similar abrasive laid on a surface plate or something equally flat, such as a piece of plate glass. This gives a fine matt surface ; the tiny scratches hold a film of oil, the valves work easily, and leakage will never take place unless the valves are allowed to become stone dry and scored.



Nice work

Anyway, our worthy brother shifted the regulator valve outside the boiler altogether, and put it in the smokebox, where, he said, it was easily removable for refacing in case of leakage. Whether that presents any advantage over taking out the backhead flange screws, and pulling the whole issue out from the footplate end, is a matter of opinion ; but there is one big disadvantage in having a disc valve in the smokebox, and that is, it gets overheated and dries up. Even in my boilers the smokebox temperature far exceeds the temperature of the steam and water inside the boiler.

More Manipulation

He also proposed fitting an injector, to give his friend a couple more valves to manipulate and keep him out of mischief ; so I gave him the cone sizes suitable for the *Tich* boiler and had a quiet chuckle when he wrote and told me he couldn't make a do of it, and the water all ran out of the overflow. I said all right, send the gadget to me and I'll teach it good manners. When it arrived, I found that the cones were decidedly not to the words and music, so I fitted a fresh set of cones and tried the injector on old *Ayesha*. On a two-mile run it fed her boiler perfectly, running or standing, without loss of water at the overflow and without any effect on the steam pressure, which I thought was plenty good enough and I returned it. But I did a bit of blowing-off myself, when fitting up the injector on *Ayesha*, because our friend had once more departed from instructions, and all his unions had flat faces instead of cones, so that I had to fix up temporary fresh pipes ! There were one or two more variations, but they weren't of much consequence.

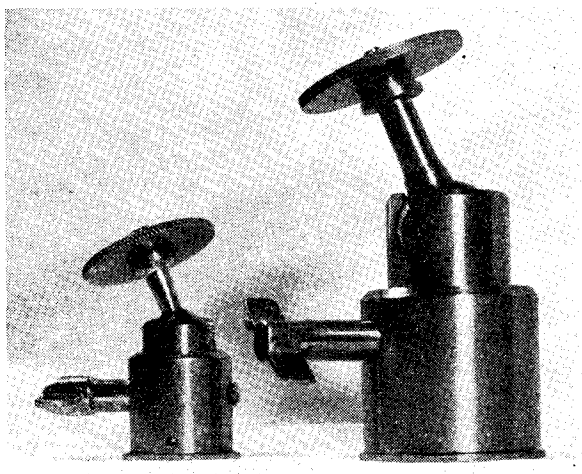
The Finished Article

In due course the locomotive was finished. Our friend, being fond of riveting and a dab hand at the game as the pictures show, ornamented every blessed thing—smokebox, running-boards, side tanks, bunker, cab roof, steps, and even the buffer beams, with a crop of neatly-arranged pimples ; and that is how she collected her name. They certainly look swell. There is an old saying that " Every picture tells a story " ; well, the photographs reproduced here tell the story of the finished locomotive in a far more effective way than ever I could by the written word, so I'll leave readers to judge for themselves the high standard of workmanship and finish on the *Tich de luxe*. It is hardly necessary to add that Inspector Meticulous will go around with his notebook, and point out that a locomotive of this type never has a lamp iron on the chimney ; most of them have one only, or two over the buffers, for indicating their whereabouts by red lights at night. They have no need of destination or classification lamps, as they never work on a main line. The bottom of the dummy whistle should have been turned to represent the whistle valve in full size, and the safety-valve escape pipes are too small ; but these are easily-remedied minor details, betraying—I'm writing this with a twinkling eye, and giving my old friend an imaginary poke in the ribs—that he is an automobile- and not a locomotive-engineer ! To sum up, I reckon that readers who take a good look at the photographs, will all agree that *Tich de luxe* alias *Pimples*, is a really smashing job, one of the star turns of a very numerous family domiciled all over the world ; and the boss will be proud to own and drive her.

A Ball and Socket Camera Tripod-Head

by A. R. Turpin

ONE of the most convenient types of camera tripod-heads to use is that designed on the ball and socket principle. These heads enable the camera to be rotated in the horizontal plane through 360 degrees, in the vertical plane about 200 degrees, and locked in position by the mere turn of a key. They may be obtained commercially, but as far as the writer is aware, only in sizes suitable for the average hand camera, which is too light for anything larger than 3½ in. × 2½ in., and so it was decided to build a larger one about twice this scale. The actual job of making one turned out to be extremely simple and only took about six working hours. The small commercial job and the larger home-made head are shown together in Photograph No. 1, and Photograph No. 2 shows the various pieces that go to make the complete job. There are no close tolerances to worry about, and even the ball need only be reasonably spherical; the socket need not be spherical at all and will work quite well if it is only a chamfer.



Photograph No. 1. The two sizes of tripod-heads

A general arrangement of the head is shown in Fig. 1 and the dimensioned details given in Fig. 2; but there is no need to keep to these dimensions, the head may be scaled up or down as required, but it is suggested that if scaled down the walls of the socket and body are not reduced too much, and on the other hand there is no need to increase the thickness much if the job is scaled up.

The head operates as follows: The ball (1) is free to move around in the socket (2), and this socket can rotate in the body (3), but if the key (4) is rotated, the eccentric portion of its stem which is housed in the body, forces the pad (5) up against the ball, which in turn is forced against the lips of the socket which tightens the flange on the base of the socket against the flange on the top of the body, thus locking the whole assembly in whatever position it happens to be when the key is turned. In order that the neck attached to the ball can be moved to, and slightly beyond, the horizontal position, a portion is cut out of the socket, as shown in the drawing. The head is screwed to take the British standard camera socket thread, that is, ¼-in. Whitworth, which, to the writer's mind, is much too small for these larger cameras; a larger disc is screwed on to this to give added support (6). The head is fixed to the tripod by means of a screwed disc which is soft-soldered to the body (7), and the clamping-key is held in position by a special 4-B.A. screw. The whole assembly is machined from mild-steel, except the pad (5), which is of bronze.

The construction is simple, and the first job to tackle is the ball, and before you can start on that you must have a spherical turning tool, and a drawing of such a tool is shown in Fig. 3. No main dimensions have been given because they will depend on the type of lathe in use by the constructor. It will be noticed that the base is much shorter than those usually specified, but it will be found that sufficient leverage will be available for the job in hand, and the user will not be troubled so much by the base fouling either the chuck or the tailstock; and further, if desired, extra leverage can be given by pushing a length of $\frac{5}{16}$ in. rod in the hole drilled in the end of the base. The base bears directly on the surface of the boring table, which, if necessary, should be scraped to a good condition. The base rotates around a steel bush which is held firmly to the boring table by means of a "T" bolt and a large diameter washer. The tool post itself is a length of mild-steel threaded at one end so that it can be screwed into the base, and tapped and slotted at the other to take a H.S. tool-bit. This tool-bit does not bear on the bottom of the slot in the toolpost, but on the top edge of a sleeve which is a nice sliding fit over the post and is of such a height that it holds

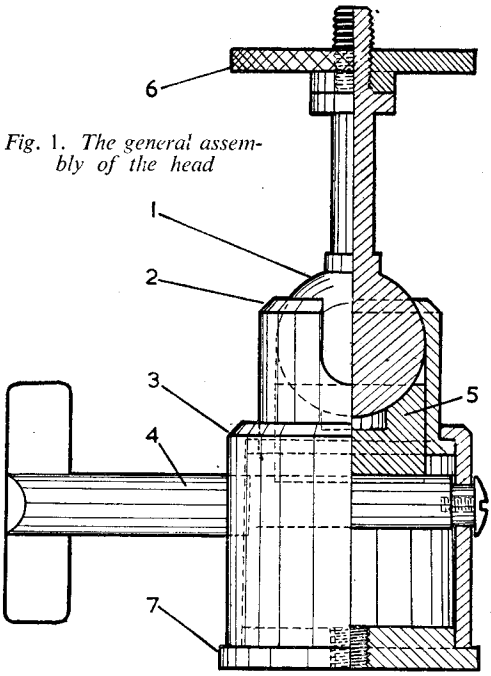


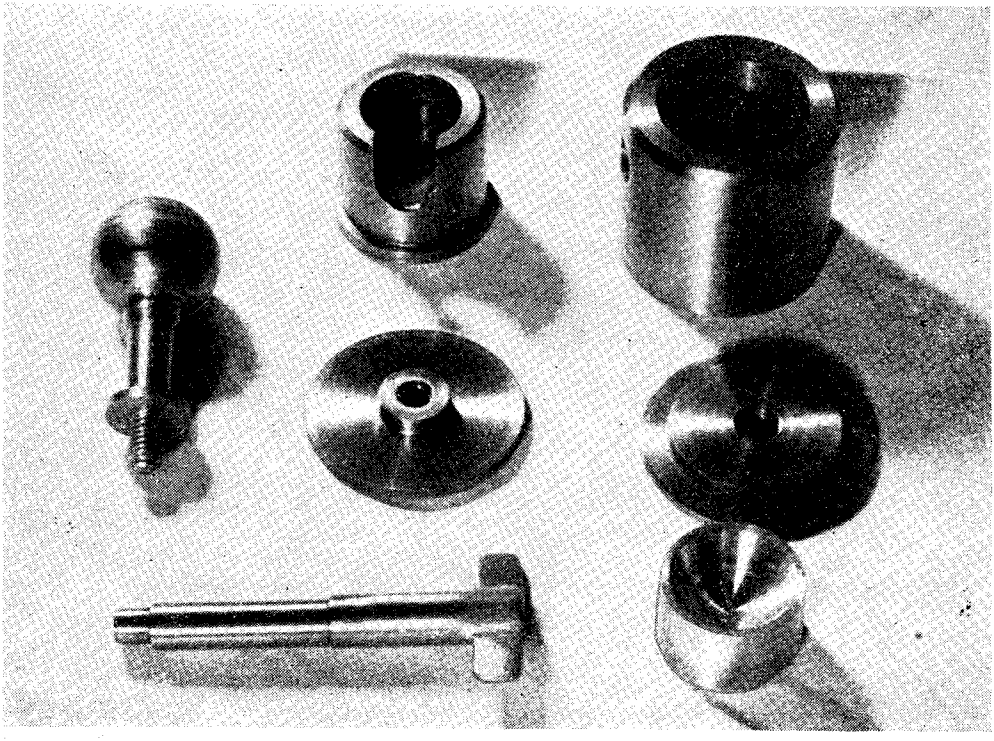
Fig. 1. *The general assembly of the head*

the cutting point of the bit exactly at centre height.

The toolpost need not be screwed right home, and this allows for the bit to be clamped at any angle in the horizontal plane by screwing down the Allen screw into the tool-bit. To allow the bit to be ground for sharpening, washers may be placed under the bottom of the sleeve. The tool in use is shown in Photograph No. 3, and it will be seen that in this actual tool, a "T" slot has been cut in the body for the tool post, which makes the setting-up slightly easier, but complicates the manufacture. Note the hole in the pivot bolt ; this is for holding a pointed length of rod, so that the pivot may be placed dead on the centre-line of the lathe, and the distance to the cutting point of the tool easily measured.

Construction

A length of 1 in. diameter mild-steel rod is chucked in the three-jaw so that about 2¾ in. projects. The back toolpost is now brought up, and with the parting tool, a groove is cut so that the diameter is reduced to about ⅜ in. diameter, further cuts are taken until a knife tool can be used and then the neck is rough turned, as shown in the Photograph No. 3. The spherical turning tool is now brought into action ; it is aligned dead on the centre-line of the lathe, and the point of the cutting tool a fraction under half-an-inch from the point of the setting-up rod, but the



Photograph No. 2. *The head before assembly*

tool should be set at an angle of about ten degrees to the centre-line of the base of the spherical turning tool, this will allow the tool to cut close up to the neck without the base fouling the chuck. There are numerous ways of tackling the job of turning a ball, and two examples are as follows : Rack back the cross-slide until the ball—in this case 15/32 in.—and then take a final cut. A cut of 1/32 in. is rather much for a finishing cut and it would be better to take two or three bites at it.

The second way of cutting the ball is to set the cross-slide so that the pivot of the cutter is dead on the centre-line of the lathe and then

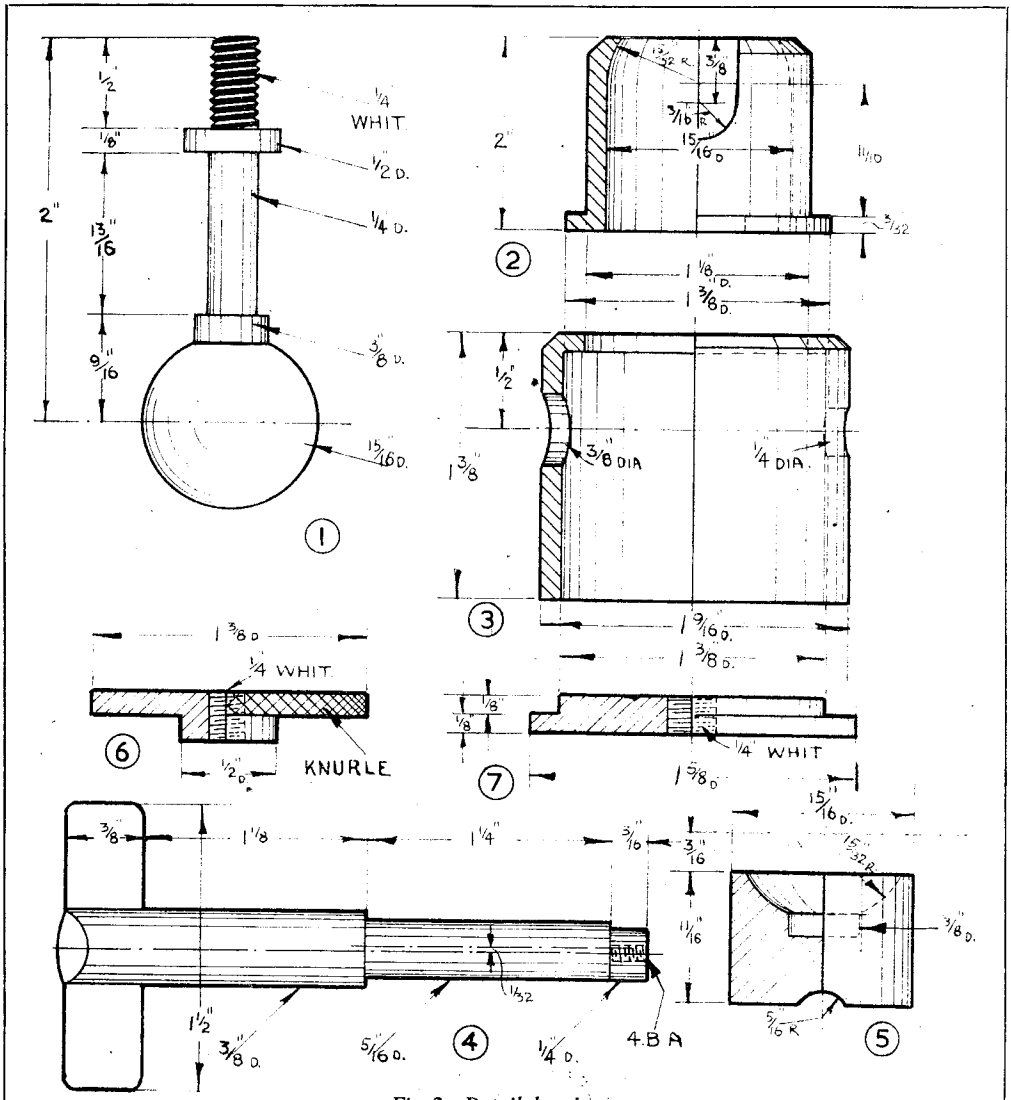


Fig. 2. Detail drawings

turning tool just touches the corner of the bar and turn this corner off, advance the cross-slide and take another cut and repeat until the tail-stock end is almost spherical ; then repeat the dose working from the headstock end until it meets up with the other half of the sphere ; now advance the cutter to the correct radius of the mark the cross-slide and the bed with a fine scratch ; the cross-slide is then moved back so that the cutter is clear of the bar. The pivot is now sighted so that it is dead in line with what will be the centre of the ball viewed across the lathe bed, and the saddle locked in this position. The cross-slide is now fed inwards until the tool

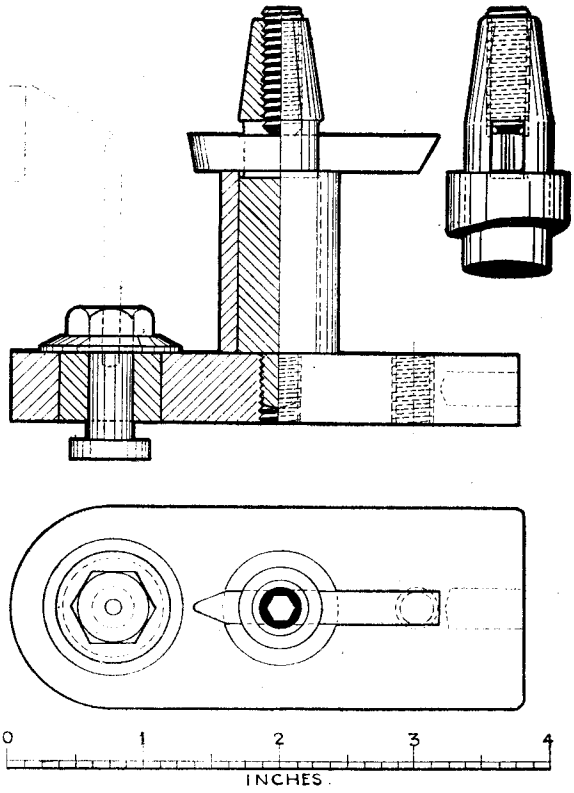


Fig. 3. Suggested general arrangement for a spherical turning tool

takes off the corners, and is continued to be fed in and cuts taken to remove both corners until a complete sphere has been formed, and this should be when the scratch on the cross-slide registers with that on the lathe bed. In this case the cutter can be set to the correct radius at the start, but it is safer to commence with the cutter set to turn a slightly oversize ball and then take a finishing cut. If the ball turns out slightly over or under size, don't worry about that, just make the other parts to fit it.

The ball should have a reasonably smooth finish, but this is for appearance only, and if the finish is really high, then the base side of the ball should be roughened by means of a knurling tool to afford a better grip when clamped.

The remainder of the turning operation on the ball and the ball neck are straightforward, all the operations except the cutting of the thread being carried out at the one setting in the chuck, using the parting tool and a knife tool. The thread is cut by hand.

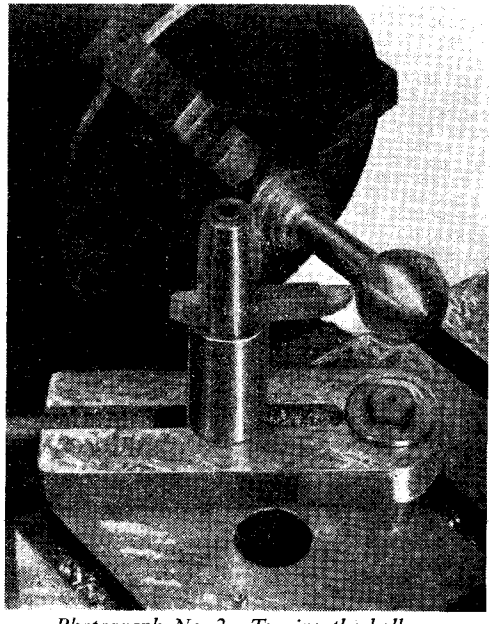
The socket is rough turned on the outside from a length of 1½ in. diameter mild-steel bar; it is then parted off to length and gripped by what will be the top end, in the three-jaw, and the inside turned to size, which should be a few thous. larger than the finished diameter of the ball. This boring job should be carried out with a tool that has a form roughly that of the radius of the ball and the socket is formed with this tool; again the fit need not be accurate. A mandrel is now turned up to be a light drive fit into the inside of the sleeve, which should now be driven on to it without removing the mandrel from the chuck, and the exterior of the socket finish turned.

The body is turned up in the same way from 1⅝ in. diameter stock, the outside being turned to size and then parted off, set to run true in the four-jaw and the interior bored to a nice loose fit for the sleeve. The holes should now be positioned and drilled.

The key is next turned from ½-in. mild-steel rod, the rod being set to run reasonably truly in the four-jaw and the concentric portions turned; the bar is then set over by manipulating two of the jaws so that it is out of centre by 1/32 in. and the eccentric portion turned. A slot is then cut with a slitting saw and a length of ⅜-in. × 16-s.w.g. mild-steel silver-soldered into this slot to form a handle for the key, but prior to this the small-end should be drilled and tapped 4 B.A. to take the retaining-screw.

The bronze pad can be turned up from a piece of 1 in. diameter bronze or brass bar. The concave spherical turning need not be a perfect fit on the ball, but if it is not a perfect fit, it should be slightly smaller in radius, rather than larger. The groove in the base should be milled or filed

(*Continued on page* 214)

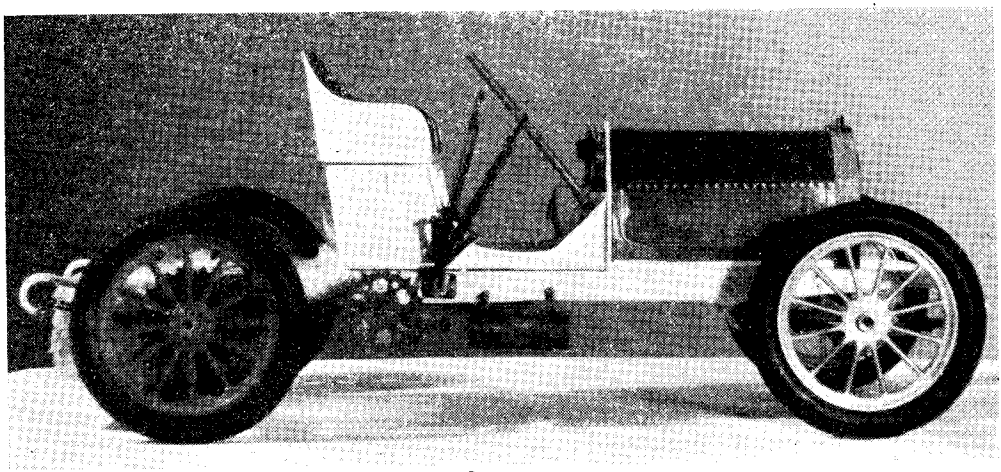


Photograph No. 3. Turning the ball

THE 1903 "GORDON BENNETT" MERCEDES

A reasonably accurate scale model built as a three dimensional portrait of a car that made motor racing history, and as a change from rail and cable racing

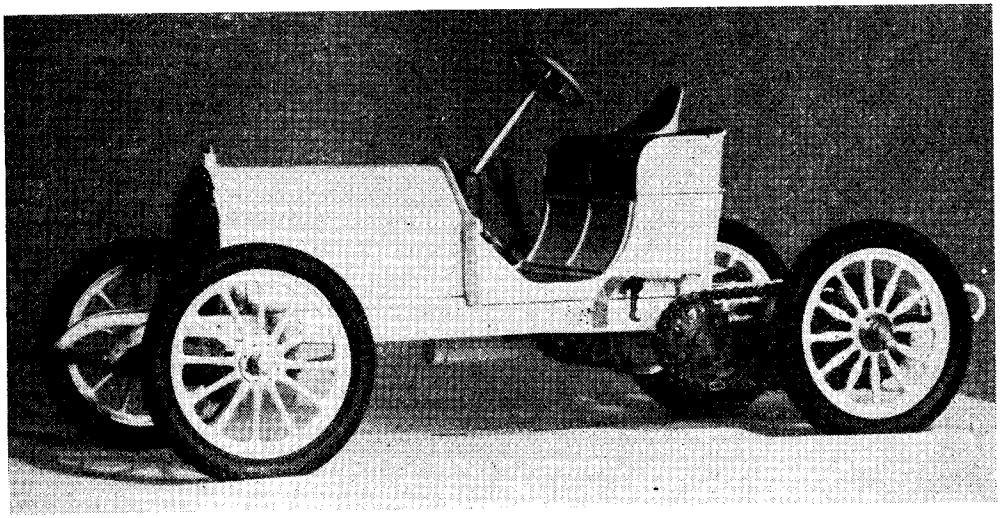
by Major T. W. Stubbs



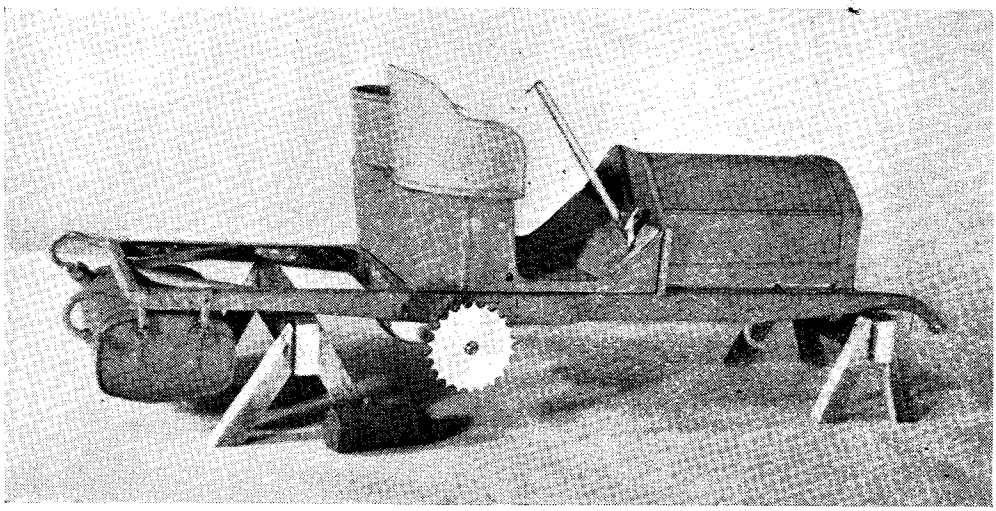
Taking shape at last. In spite of being at least three different colours and having tyres a trifle oversize the "03" Merc. starts to appear

THE first set of wheels were correctly built with spokes and felloes carved to shape from hickory, as in the original. They were highly finished, drilled in the appropriate places for sprocket security bolts, and hub caps, and fitted with "Meccano" tyres. When completed they were fitted to a light, under-powered, mock up and subjected to a road test. Their performance was as vaguely anticipated and, after a few laps they collapsed in a most realistic manner.

Continued from page 172, "*M.E.*," *August* 7, 1952.



Almost finished. Rear brake drums, the odd strap or so, and the undershield are still to be fitted, but these items, although completed, must wait until an engine is fitted



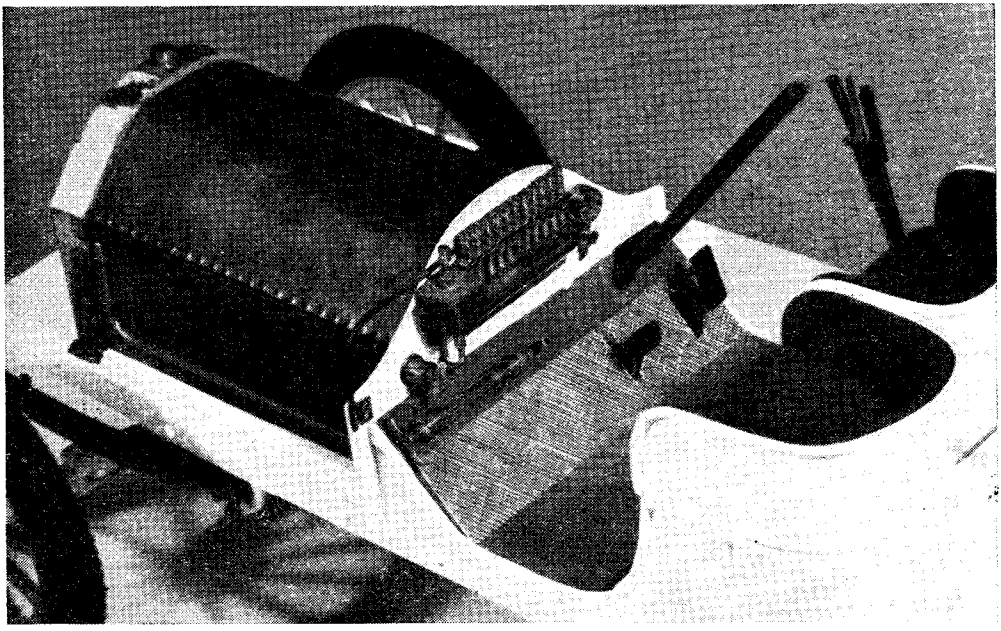
Early stages and a forecast of things to come. However, the whole body and seats had to be scrapped, owing to the arrival of more and accurate information

A wooden pattern was made next by building up layers of plywood, fret-sawing out the spaces between the spokes, filing to correct section and chamfering in the right places. This pattern was sent to England for casting and machining, and in due course returned, for cleaning up and drilling for the various bolts, etc.

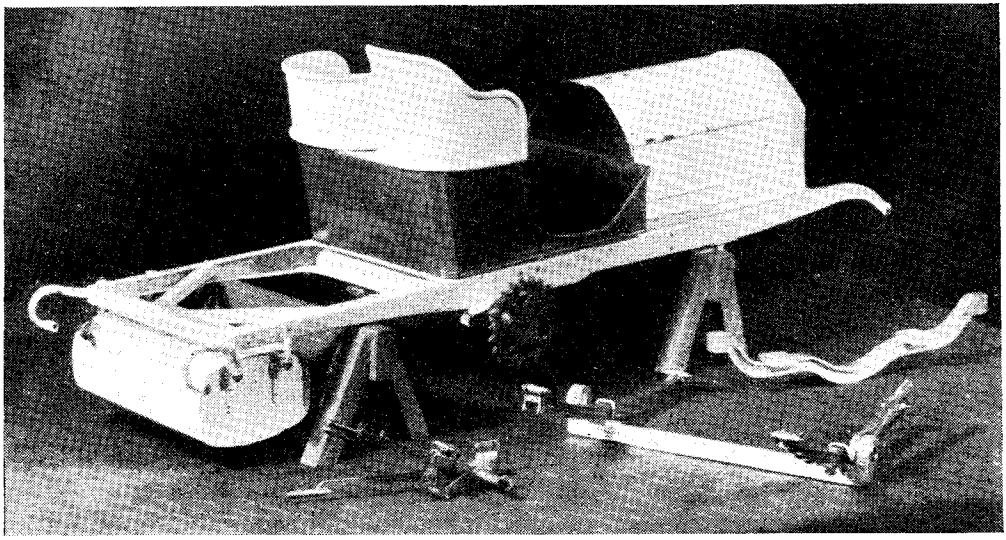
Rear brake drums are turned from beech, bolted into place and are complete with dummy operating levers.

Handbrake and gear lever were built up from brass strip with handgrips made from brass tube filed to a slight taper and soldered in place. Ratchet release rods were short lengths of piano wire, pawls were made from minute scraps of brass, and the return spring wound from fuse wire.

The handbrake lever extends below its central pivot and terminates in a grooved crescent. The pivot, a hollow tube, passes through the body-



Final fitting. All the bits and pieces go together to ensure that everything is at least in proportion



The rebuilt bodywork and seats are "fitted on" to the completed chassis. Axles, springs and shackles can be quite clearly seen, but the stub axles have not yet been fitted to the rear axle

work and is fitted with a similar extension at the other end. The brake cable passes through the hollow pivot and thence around the grooved portions to the cam-operating lever at the brake drum, thus leverage is obtained for the operation of the rear brakes.

Gate and supporting bracket were filed from brass, the bracket being in the form of "V" with the gate soldered between the wide points. The whole assembly is bolted to the chassis member with 10-B.A. hexagon bolts and all nuts split-pinned, as in the original.

The oil tank with its pointed nose is held in place by two straps not unlike "jubilee" clips and again, all nuts are split-pinned.

It will now be quite obvious to all and sundry that a howling diesel or any other form of high speed one lungery will just not do for a car as described. Under-bonnet space, although good, is rather limited owing to the short bonnet of the original, and both the "Seal" and "Seagull" are too large to fit with sufficient space left for the coil and carburettor, etc.

The answer appears to be a single-cylinder version of the "Seagull," with magnets ignition and overall width reduced to minimum. Such an engine, however, is slightly less common than radium, and frequent frantic appeals have as yet failed to produce results. As a matter of interest, if such an engine did ever come on to the market, more accurate powered scale models would be built and model cars would begin to take their rightful place in the model engineering world.

At the moment the car awaits an engine, but, in spite of that, it was passed by the Daimler Benz AG Museum authorities as an accurate reproduction and will shortly, either with or without engine, pass into their museum as a permanent exhibit.

A Ball and Socket Camera Tripod-Head

(*Continued from page* 211)

after a trial assembly has been made, and the final fit should be such that the ball is just free when the key is in the unlocked position. The gap in the sleeve should now be cut by drilling, hacksawing, and filing. The camera support disc and the base disc are a straightforward turning job; and after the base has been turned a loose fit on the body, it is soft-soldered to it. If a corrosive flux has been used, the assembled job should be well washed in a detergent, rinsed in hot water and immediately dried by heating.

A FOUR-CYLINDER "VEE" TYPE MARINE ENGINE

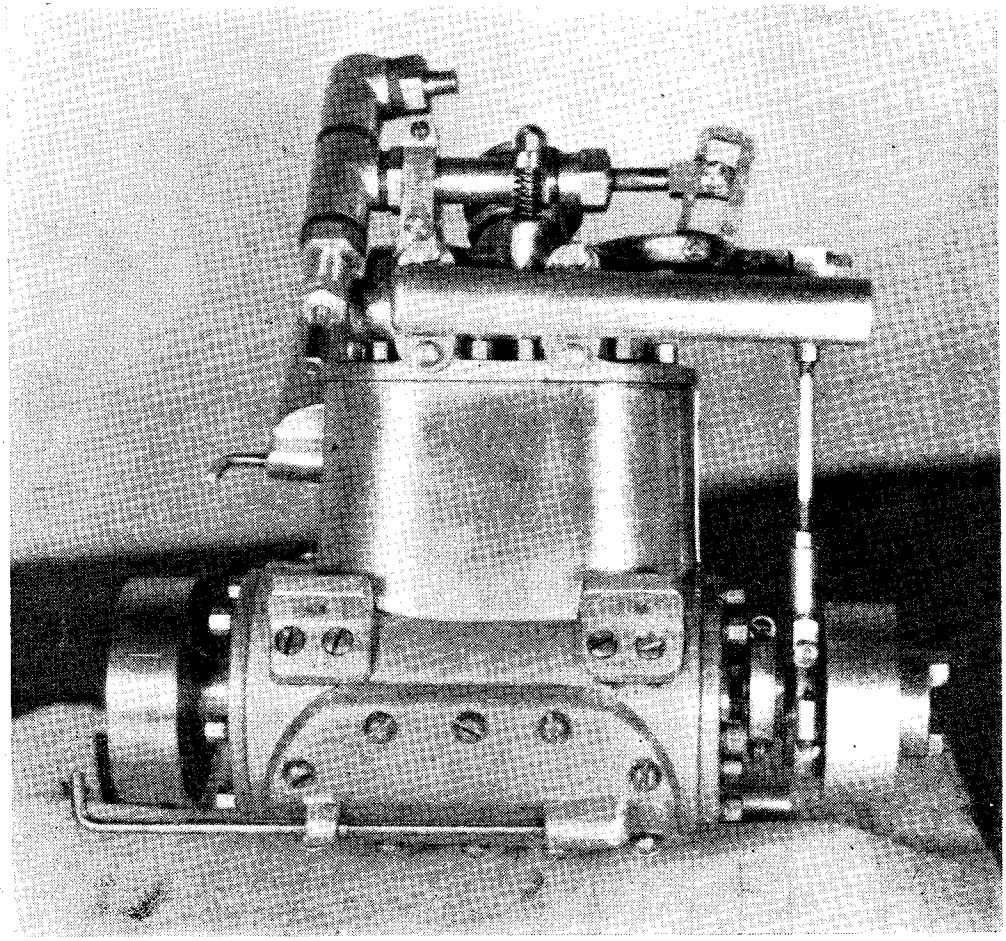
by Warren W. Lacy, Jr., M.D. (New York)

THIS engine should be of interest to readers of THE MODEL ENGINEER. It is based on a free-lance design, gradually evolved during my travels in the late war.

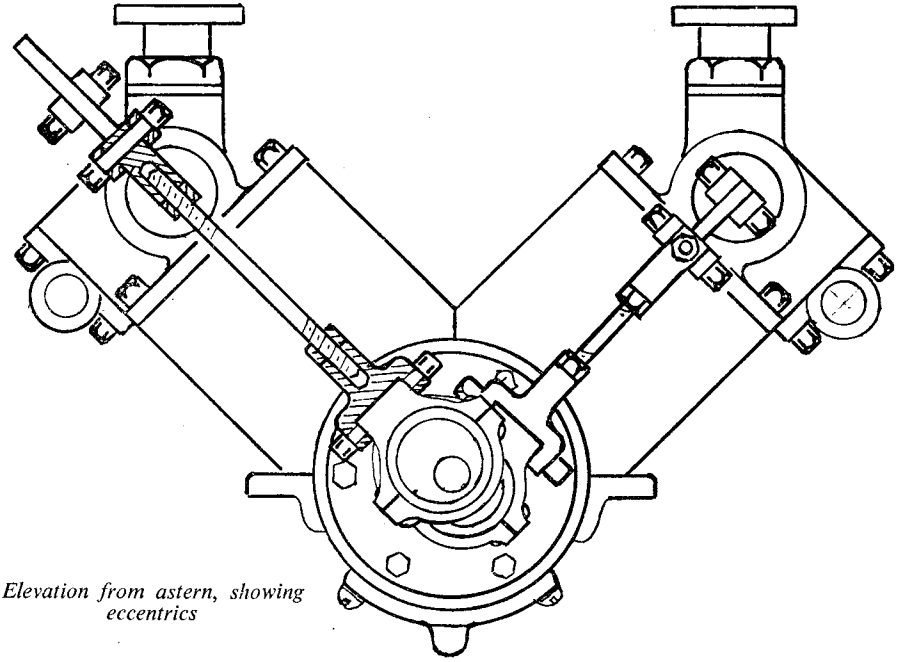
First thoughts about it were in the South Pacific while with an infantry unit in 1942. Periodically, the opportunity would present itself to smooth out crumpled scraps on which had been sketched this or that layout. These were, little by little, added to the official drawings of the project.

The earliest opportunity to begin work was on the steamship coming back to the United States, when the first patterns were whittled. Since the war was still going on, work progressed slowly. The first castings were poured at an army orthopaedic shop, and the last were poured after return home late in 1945.

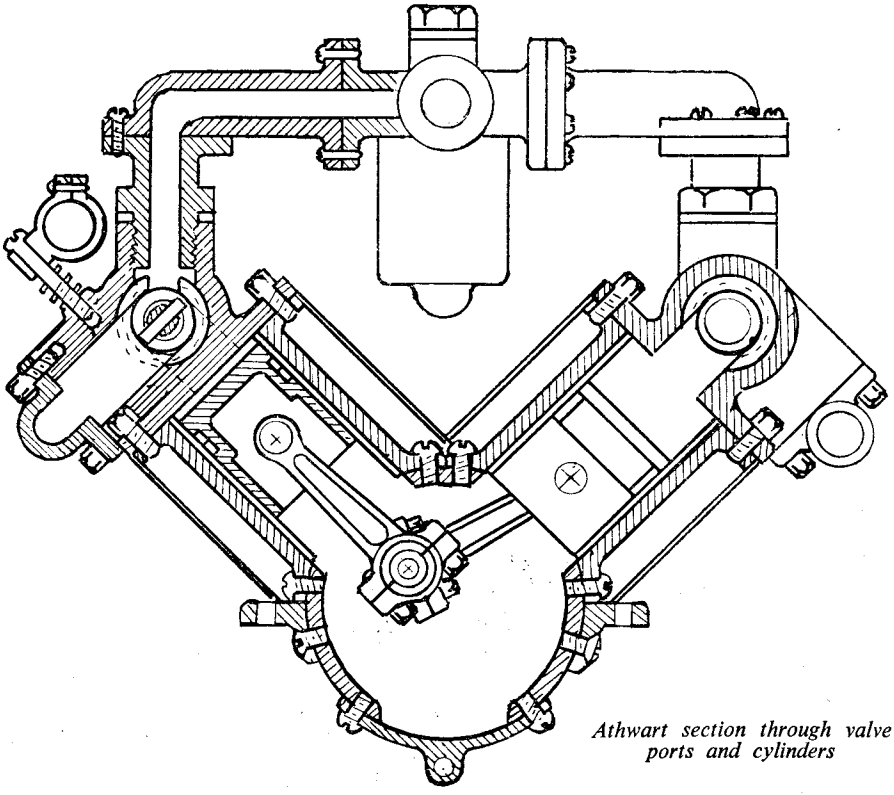
The basic idea was a racing steam engine to be fed by a flash generator. It was to propel a hull approximately 48 in. in length. A bore of $\frac{7}{8}$ in. × $\frac{7}{8}$ in. stroke was decided upon. Contemplated high speed suggested a single-acting design to avoid stuffing-boxes. Four cylinders were desirable for smooth torque and elimination of dead centres. A "vee" type seemed to lend itself to a low centre of gravity and compact, minimum length installation in a "vee" bottomed hull. To minimise weight, aluminium alloy was specified for structural parts, while frictional



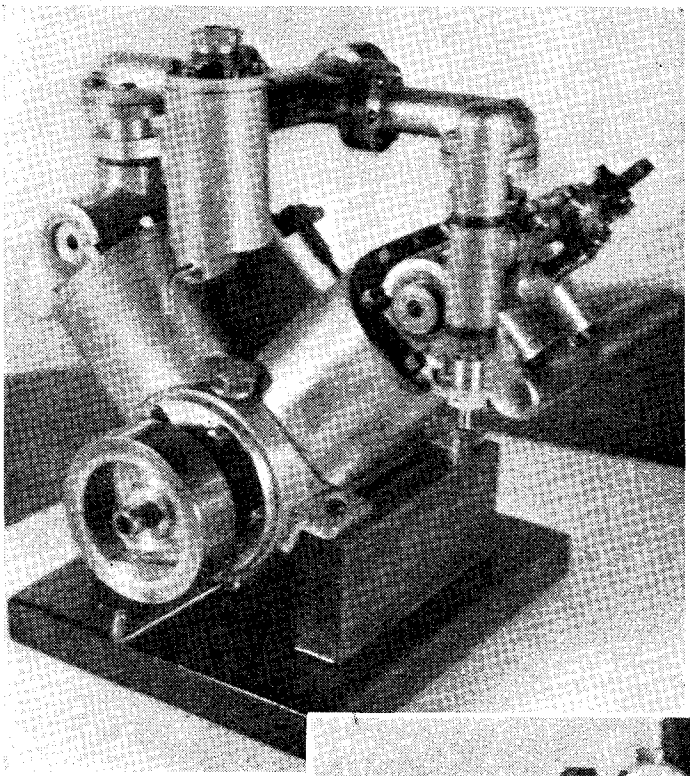
Underside of port block, with boiler feed-pump and Scotch yolk at top



Elevation from astern, showing eccentrics



Athwart section through valve ports and cylinders



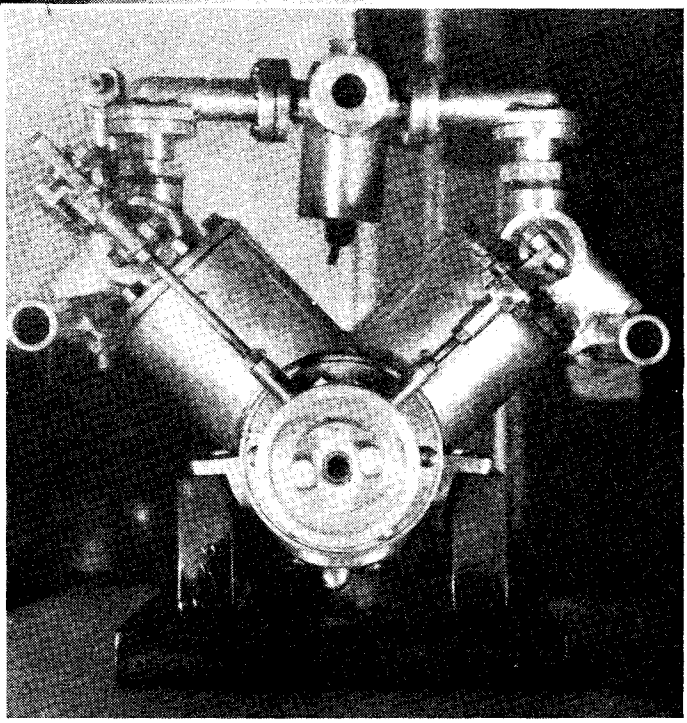
Forward end, from port side with view of piston-valves

components were sleeved or bushed.

Slide-valves offered the prospect of automatic relief for condensate caught in the cylinders, but would not enable the flash boiler to be primed by cranking the engine. Since the latter feature was desired, piston valves were selected. The greater port opening possible with piston valves was also desired. To avoid locking of the engine on a water slug, practically full expansion was provided by very little eccentric lead and a small accompanying valve lap. However, since maximum power-weight ratio was of first consideration, this was not considered too important a shortcoming. Overhead arrangement of piston valves made it possible to provide very short cylinder ports with no detours.

Both eccentrics were placed at the same end of the engine so that, in 180 deg. opposition, dynamic balance would be better preserved and vibration held within limits. In such an arrangement both valves would normally be driven from one eccentric. Therefore, the opposite positioning of eccentrics was compensated by a reversal of rocker arm on the port side. This was an advantage in making possible the extension of that rocker as a yoke to drive the feed pump. The valve motion illustrated requires several more hinges than would be the case were ball joints used. However, the difficulty of accurate machining of the latter discouraged them. It was, of course, desirable to eliminate the sloppy joint that is sometimes seen to allow for the necessary three-dimensional motion required of this action.

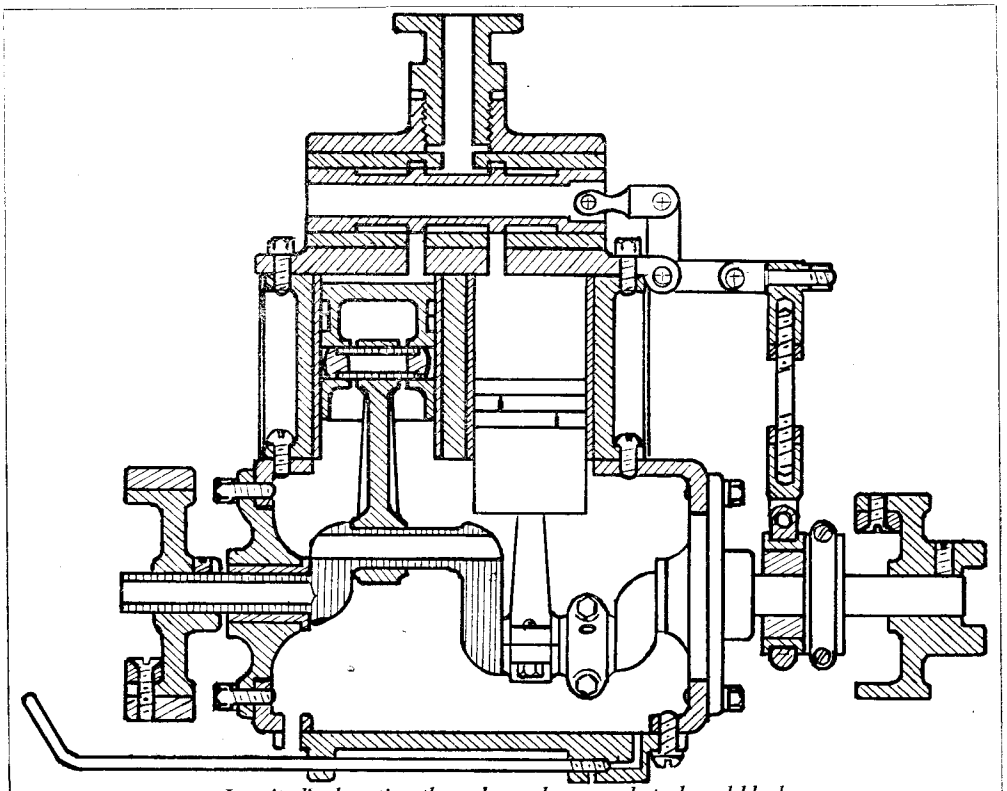
The crankshaft was dynamically balanced externally to the crankcase. In a "vee" arrangement such as this, a 180-deg. double-throw



View from astern, showing eccentric-rods, main steam inlet (above) and exhaust pipes (at sides)

shaft has static balance, but in motion sets up a whipping couple unless counterbalanced in some way. The amount of weight necessary for this is in inverse proportion to the distance forward and aft of the counterweights from the central crankshaft web, and also, in inverse order, to their eccentric distance from the centre of rotation. Within limits, the less the stroke volume, the hotter the steam and the more power at the crankshaft.

The crankcase barrel is cylindrical. It was machined from solid so that all registering cuts could be taken between centres at one setting thereby assuring concentricity and parallelism



Longitudinal section through crankcase and starboard block

Considerable total weight is therefore saved by balancing the flywheels rather than the shaft webs. Consequently, the counterweights, segments of discs, were secured inside the rims of the forward and aft flywheels. The forward flywheel is made of aluminium and has a shrunk-on cast-iron rim so that weight was added where it counted the most.

Lubrication is splash for the crankcase and lower cylinder walls. A displacement lubricator is provided on the steam pipe for valves and upper cylinder walls. Since piston valves require very little driving effort, it was not considered necessary to include the eccentrics within the crankcase. A crankcase drain is accessible without removing the engine from the hull.

The present engine is provided with a directly-actuated boiler feed pump whose stroke is adjustable while in motion. As yet, no difficulty has been encountered on account of the direct drive, perhaps due in part to ample cross-sectional area of the suction pipe. The adjustable stroke is of great use in accurate control of steam temperature.

of end plate seatings, one with the other, and squareness and concentricity of same with the external surface. At this same setting, two lines were scribed along the length of the barrel at 90-deg. from one another and circumferential lines scribed for future registering of cylinder blocks. The unwanted metal within was then bored out with the work held in the four-jaw chuck, accuracy in this latter operation not being critical.

The end plates were bored for bronze bushes. With these driven in place, the end plates were turned to a snug fit in the ends of the crankcase barrel, and at the same setting, the bushings were drilled and reamed for the crankshaft. The end plates were indexed for six retaining screws, which were provided with fibre washers, since the screws extend through the crankcase shell.

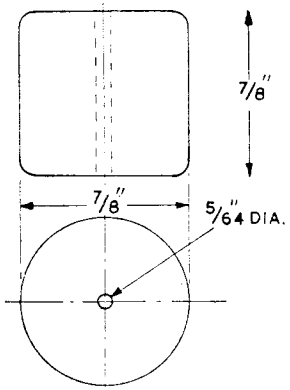
The crankcase barrel was held crosswise on the face-plate for boring holes through the shell to match the cylinders and crankpan.

(*To be continued*)

A Carburettor for the "Busy Bee"

by Edgar T. Westbury

CARBURETTOR floats, in commercial practice, are generally made from two deep pressings in very thin copper or cartridge brass foil, with an equally thin tube through the centre, and a single soldered joint around the outside. Home-made metal floats are generally made with shallow spun endplates, with a lapped and seamed wrapper, to avoid the difficulty of deep drawing or spinning. I have made fairly successful floats by this method, and so have many other constructors; but they have the obvious disadvantage of introducing *three* soldered joints



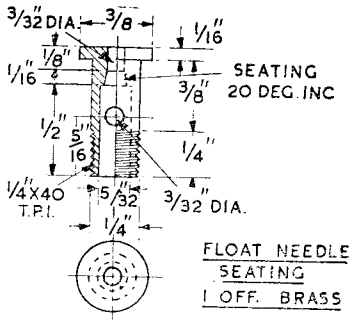
FLOAT 1 OFF
CORK OR BALSA

instead of one (neglecting the central tube), and despite every care to ensure that the minimum of solder is used, the buoyancy of the finished float is usually impaired to some extent. As it is most important that the float should perform its function efficiently, the lightest possible form of construction is essential, and for this reason, I have recommended that it should be made of cork or balsa, the latter being the lighter of the two materials.

In case it should be thought that this is shoddy practice, it may be mentioned that cork floats have been used with success in full-size carburettors, including those of aircraft engines, where reliability is the very first consideration. But, of course, the constructor has the option of making the float in any way, and of any material he chooses.

It is rather difficult to turn cork or balsa accurately to shape, and I have found it best to pare it with a sharp knife or razor blade, well oversize, and hold it in a piece of tube in the lathe chuck for finishing with glasspaper. The drilling of a truly concentric hole through the centre is also a tricky operation, and it will be found advisable to drill from each end, with a drill projecting only just sufficiently from the chuck to go half-way through, and run the lathe at the highest possible speed.

Cork or balsa must be thoroughly proofed with a non-soluble varnish to avoid absorption of fuel, which would impair buoyancy. For use with petrol, cellulose or (shellac) spirit varnish is satisfactory, but alcohol-base or other "fancy" fuels have powerful solvent properties, which present problems in proofing the float. Synthetic or phenol varnishes have, however, been used successfully with these fuels. Before varnishing, a suitable "filler" should be applied to stop the pores of the wood, which is otherwise liable to absorb varnish *ad infinitum*; two or three coats



FLOAT NEEDLE SEATING
1 OFF. BRASS

of the filler may be found necessary. Don't forget that the bore of the hole must also be proofed; the hole is drilled slightly oversize so that the thickness of the varnish film is allowed for.

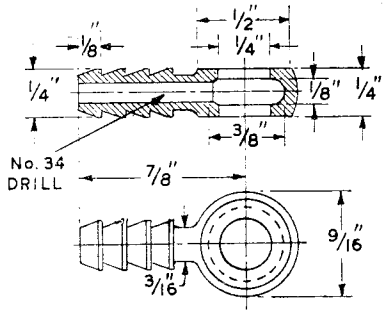
Float Needle Seating

This is turned from brass and is made a tight press fit in the hole in the float chamber base. It can be machined all over at one setting, care being taken to drill and counterbore the centre hole truly. To form the seating, it is advisable to make a small D-bit from silver-steel, with the end turned to an included angle of 20 deg., and filed away to exactly half its diameter. After hardening and tempering, the flat face should be oilstoned dead smooth and keen to ensure that it produces a high finish. The importance of a tight-sealing float valve, and its influence on carburation, cannot be over-estimated.

Fuel Inlet Union

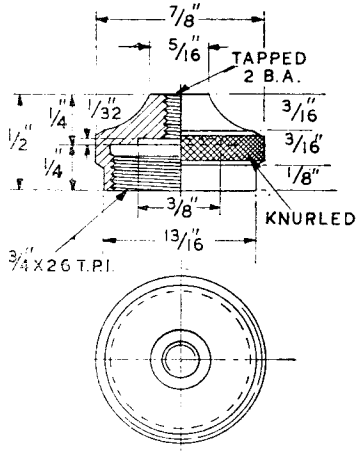
The "banjo" type of union shown here will generally be found most convenient to suit the fuel pipe line, especially where compactness is desired. It is intended to connect to flexible

Continued from page 159, "*M.E.*," *July* 31, 1952.



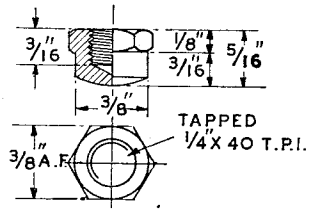
FUEL INLET UNION
1 OFF BRASS

p.v.c. or neoprene tubing, which will give reliable and durable service if properly fitted. To machine this item, I recommend that the serrated end should be turned first and the centre hole drilled to about $\frac{5}{8}$ in. depth. At the same setting, a part of the spherical end may be roughed out, a radius gauge being useful as a guide to its shape. It may then be parted off, and the serrated end held in the chuck for finishing the sphere. The use of a simple ball-turning attachment, such as I have described on previous occasions, is very useful for this job, but as the appearance is all that matters, a hand tool will do the job quite well if the radius gauge is used as a guide to the correct shape. It should, however, be noted that *slovenly* work will be very conspicuous when the cross hole is drilled and faced.



THROTTLE CAP
1 OFF L/ALLOY

For the latter operation, the component can be held at right-angles to its main axis in the three-jaw chuck; the serrated end will pass between two of the jaws, and should be set parallel with the chuck body. A strip of foil may be used to prevent bruising of the spherical surface. Centre-drill the ball, and take a facing cut before drilling, which should be done by easy stages, as the grip of the chuck is a little precarious, and heavy thrust may cause the work to shift. A small internal recessing tool will be required to chamber out the inside. The other face can



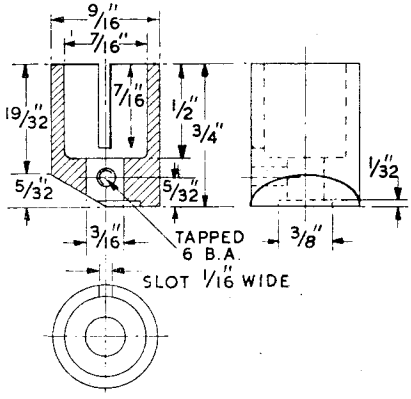
FUEL INLET CAP NUT
1 OFF BRASS

be machined by pressing the work on a pin mandrel. Finally, complete the drilling of the fuel passage.

The fuel inlet cap-nut is a simple item which requires little explanation, being simply a blind nut which holds the banjo in place and seals off the bottom of the seating. It is, however, important that the face should be truly flat and square with the thread, to ensure a tight joint.

Throttle Cap

Brass may be used for this item if a suitable piece of light alloy (preferably dural), is not available. It is screwcut inside to fit the thread on the outside of the barrel, and a recess is formed to locate the throttle spring, also a hole drilled and tapped through the centre to take the cable adjuster. The external machining is mainly a



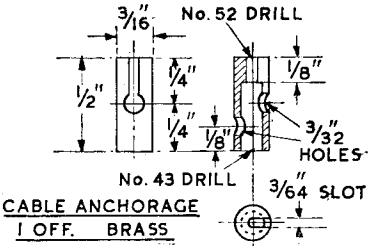
THROTTLE PLUNGER
1 OFF DURAL

matter of appearance, but knurling or serrating of the edge is essential to enable it to be screwed on firmly by hand. All machining can be done at one setting, and the job finally parted off.

Throttle Plunger

If dural is not available, bronze or stainless-steel should be used for this part, as it is the only

part liable to any considerable wear ; it should definitely be harder than the bore of the barrel. Nearly all the turning on it can be done at one setting ; the external surface should be finished to a smooth and not too tight working fit in the barrel, but there should be no perceptible slackness. Before parting off, the $\frac{1}{16}$ in. guide slot may be cut in the side, the work being held by its chucking-piece in the toolpost and a small



slitting saw or Woodruffe cutter used. It would also be possible to shape the cutaway before parting off, and thus avoid the problem of clamping this rather fragile component.

The recess in the base is intended to fit over the top of the jet tube when the plunger is right down, and thus ensure that it cuts off completely at the discharge side. A hole is finally drilled and tapped, on the same line as the guide slot, for the needle clamping grub-screw.

Cable Anchorage

The means of attaching the Bowden cable, and also the modulating needle, to the plunger, differ from those most commonly adopted, and will be found to facilitate assembly and adjustment. The component shown may be made from brass rod, which should be turned to a close push fit in the base of the plunger and truly drilled and counterbored in the centre. Before parting off, the two 3/32-in. holes may be drilled in opposite sides (it is not essential that they should be in exact opposition). The slot may be cut with a small slitting saw ; it may be taken below the cross hole if this is found necessary to get a clear cut into the centre hole, but should not pass through the full length of the component, if this can be avoided.

Float, Jet, and Modulating Needles

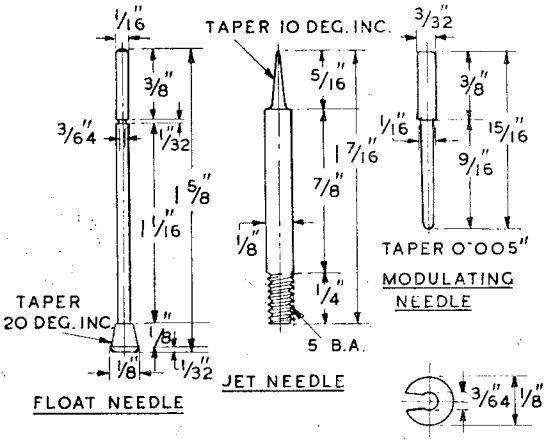
The most suitable material for these is stainless-steel, but this is rather difficult to obtain at present, and the next best substitutes are German-silver or phosphor-bronze. Hard brass, which is definitely inferior, may, however, be the only material available, and will serve its purpose if carefully handled.

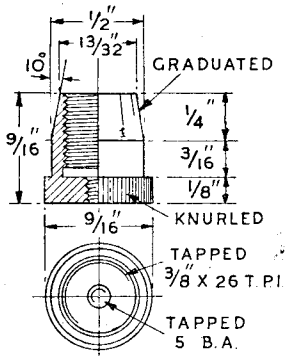
The float needle should preferably be made from the solid, but this is a rather difficult operation unless a special running-down cutter or " box tool " is made. As an alternative, however, the head may be made separately, and screwed on ; it is best to reverse this order, by turning up the head on a piece of $\frac{1}{8}$-in. rod, drilling and tapping it 10 B.A., and before parting off, screwing in tightly a piece of $\frac{1}{16}$-in. rod. In this way it is possible to verify that the shank of the needle is perfectly straight and runs truly with the head ; if not, it is best to start all over again, as the needle will never be really satisfactory if this condition is not fulfilled.

Great care should be taken in finishing the angle of the seating so that little or no subsequent grinding-in is necessary. I find it an advantage to make the surface very slightly convex, by means of a hand tool, after turning as accurately as possible to the specified angle. The groove for the needle clip should not be cut until its correct position has been ascertained, on assembly, so that it allows approximately $\frac{1}{16}$ in. lift of the float.

The needle clip is a small washer cut from thin sheet brass, and slotted out so that it can just be forced over the groove of the needle. Incidentally, it is always a problem to devise a satisfactory means of transmitting the float movement to the needle without introducing extra weight. I have devised many different forms of needle clips, all of which work if properly made and

(*Continued on page 223*)

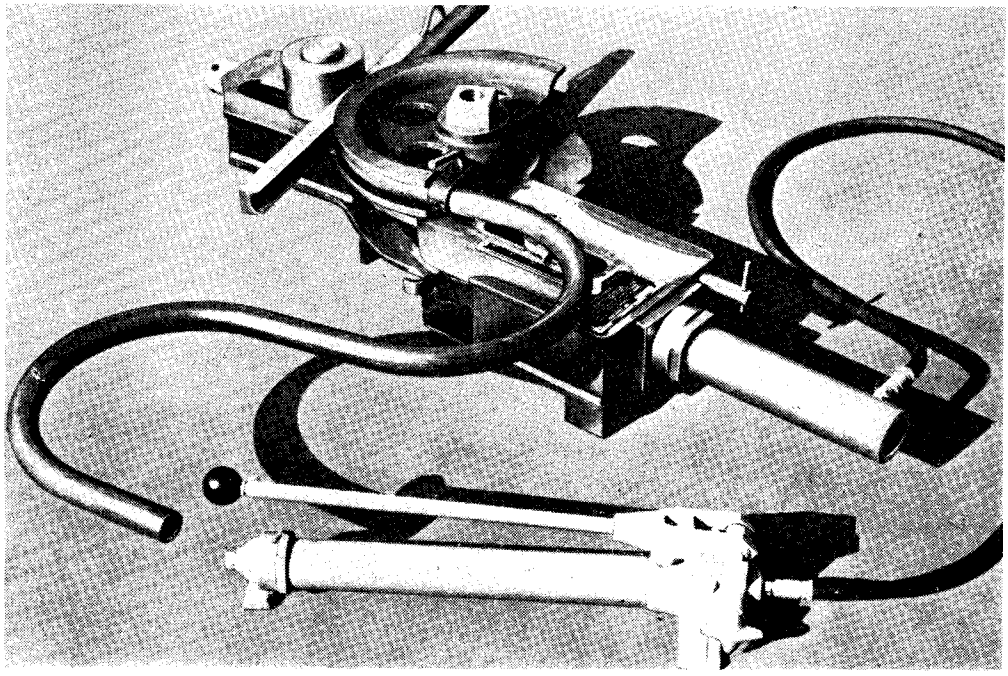




HYDRAULIC POWER IN THE WORKSHOP

SINCE the invention of the hydraulic press by Bramah, there have been many important developments in the design of hydraulic appliances for industrial use. From the aspect of engineering production few of these are more important than the application of hydraulic power to machine tool movements, which has become increasingly popular in recent years, and some types of machines are arranged to carry out copying operations entirely automatically by hydraulic control. The Bramah press, differing little from its original form except in the means of producing pressure, is indispensable in the manufacture of moulded plastics, and its principle is also applied to injection moulding and die-casting machines.

But in the small workshop, there have been relatively few attempts to make use of hydraulic power, and with the exception of the hydraulic lifting jack, its possibilities appear to have been almost completely overlooked. There are many occasions when a simple hydraulic appliance could be utilised to perform with ease an operation which would be extremely difficult, or even almost impossible, by other means. In nearly every workshop, at some time or other, there arises the need for some means of applying a heavy but completely controllable force, such as in the insertion or removal of tight bushes or pins; and there is nothing to equal a hydraulic appliance for this purpose. Many mechanics know of no other tool than a big hammer for coercing reluctant jobs into the desired place or state, but everyone knows of the all-too-common results of such treatment, in the bending, burring, or "mushrooming" of parts on which much care and skill has been devoted in making them initially accurate. The use of steady but equally positive pressure would entirely eliminate the risk of damage to the parts.



A ratchet-type hydraulic bending machine, with manual pressure pump

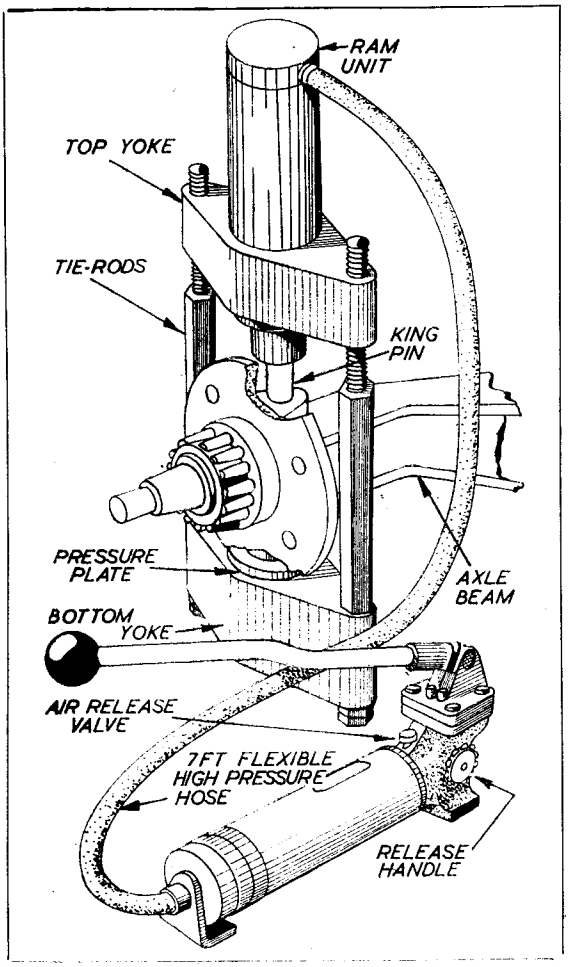
A device which has many useful applications in the light construction or repair workshops is shown herewith. It comprises a small but robust form of hydraulic press, in conjunction with a hand-operated pump or "Hydroram." The latter enables a pressure of 5,500 p.s.i. to be obtained with moderate manual exertion, and this, applied to the press, produces a force of 12 tons. In view of its lightness and compactness, the appliance can easily be carried to the job, and used in positions where space is limited; it can also be adapted for use as a mandrel press and many other purposes. The maximum stroke

of the press is 6 in., and it will admit a maximum length of 12¾ in., with a width, between the tie rods, of 8 in.

Applications

The hand-operated pump can also be applied to a bench press having the same power capacity, or a hydraulic pipe-bending press, as shown in the photograph. The latter appliance employs the ratchet bending principle, the ram being offset, so that it produces a rotary motion of the former, which is made to fit exactly to the diameter of the pipe to be bent, and backed up by a roller with a straight former of similar contour. One complete stroke of the ram produces a bend of 60 deg. arc, and a back-stop pawl is used to prevent the tube springing back while the ram is withdrawn for a further stroke. Bends up to 180 deg. may be thus made, and can be started within 1 in. of the end of the tube. As the distortion or collapse of the tube is prevented by the all-round support of the former, at the point where force is applied, thin-walled tubing can be bent without filling. Compound bends in different planes can also be dealt with quite easily. The machine illustrated has a capacity from 1 in. to 2⅛ in. outside diameter pipe, of 16- to 19-gauge, and formers are available for sizes within these limits, in ⅛ in. increments.

These appliances are manufactured by Chamberlain Industries Ltd., Staffa Works, Leyton, E.10.



Right—A hand-operated hydraulic press removing a front axle king-pin on a lorry

A Carburettor for the "Busy Bee"

(*Continued from page* 221)

fitted, but only too often find that constructors have given up the struggle with them and resorted to the inevitable blob of solder—sometimes heavy enough to sink the float!

The jet needle is made from ⅛-in. rod, which should be chucked *truly* by whatever means is available, first for turning the point, and then in the reverse position for screwing the other end. Accurate chucking is also essential for dealing with the modulating needle; it is a good policy to make two or three of these with slightly varying degrees of taper for tuning purposes, but the necessary modification can be made by filing in the lathe with a dead smooth Swiss file. The end of the needle should always be rounded, or better still, pointed, to facilitate assembly.

Jet Adjusting Thimble

In machining this part, the important thing is to ensure concentric alignment of the internal threads. The larger bore should be flat-ended and undercut or "chambered" so that the maximum effective length of thread can be utilised. The external machining can be carried out at the same setting, also the incising of the graduations, by using a point tool on its side, exactly at centre height, the top-slide being set at the same angle as for turning the external taper. It does not matter how many divisions are used on the index, as they are purely arbitrary, but I suggest that ten or twelve (either obtainable by a 60-tooth index wheel) will be suitable, and they should be numbered. The thimble is screwed on the jet needle, and secured by a lock-nut, so that its initial setting is adjustable, but it may be fixed permanently, as by sweating on, if desired.

(*To be continued*)

Notes on Fitting Washers

ALTHOUGH washers may seem small and insignificant things, they do, nevertheless, play an important part in maintaining the correct appearance of a scale model or of any other well-finished piece of mechanism.

In this connection, we recall seeing at an exhibition a model of an old-time stationary engine where, here and there, a cadmium-plated, *ex*-R.A.F. washer had been used—an example of modern engineering practice surely undreamt of by the makers of the prototype. Even if the engine had been of modern design, such a miscellaneous collection of washers would have offended the critical eye.

Commercial steel washers are usually punched out of sheet material, and those of best quality used to be machined on the edges and chamfered; but nowadays highly-finished washers are not always easily come by and, instead, the edges are often left as they leave the punch and the chamfer may be irregularly formed.

Where well-finished washers are required, it may, therefore, be necessary either to remachine commercial washers, or to make them afresh from round material as described in a previous article.

Machining Washers on an Arbor

When a batch of washers of any one size has to be chucked and remachined in the lathe, a simple, shouldered, parallel arbor fitted with a clamp-nut is usually all that is needed.

If, as shown in Fig. 1, the carrying portion of the arbor is made long and distance collars are fitted, a large or small number of washers can be mounted for taking a finishing cut over the full length of the pile. After the end washer has been chamfered, it is removed, or put behind, so that the remainder can be machined in turn.

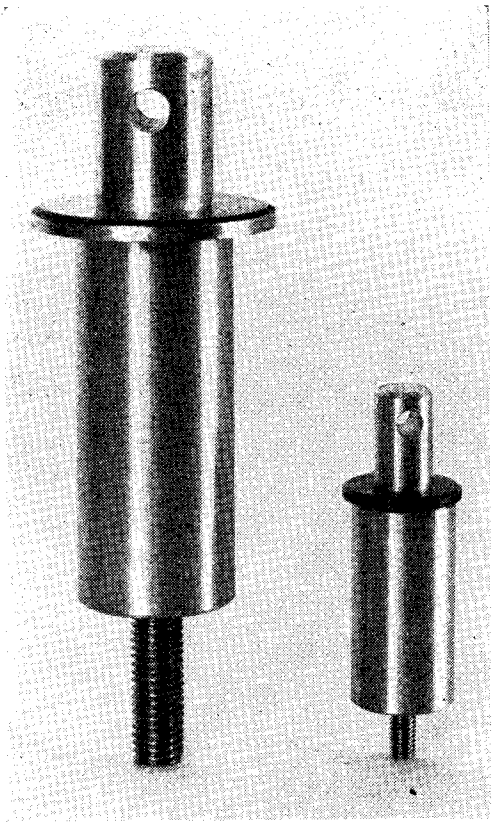


Fig. 2. *Arbors for holding washers of various sizes*

To make an arbor of this kind, a short length of round mild-steel is gripped in the chuck and, for future reference, a punch mark is made opposite to No. 1 jaw. The diameter is, next, reduced to fit the bore of the washers, and the shoulder is machined flat and square. The threading operation is carried out either from the tail-

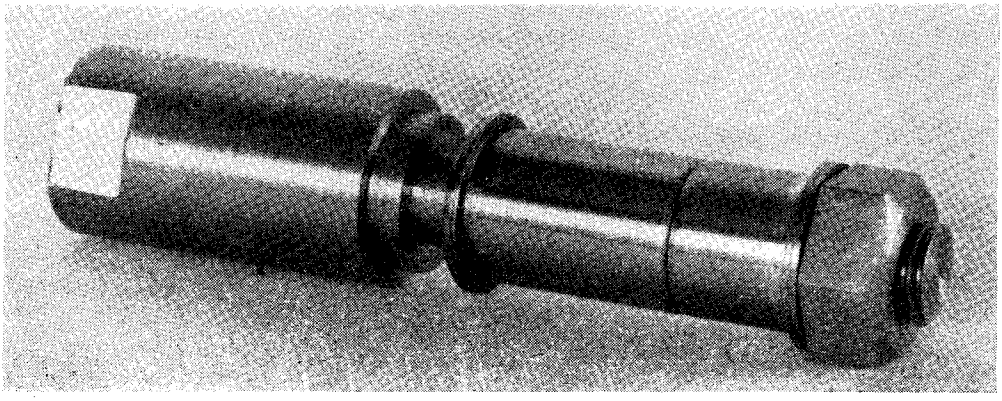


Fig. 1. *A chucking arbor for machining washers*

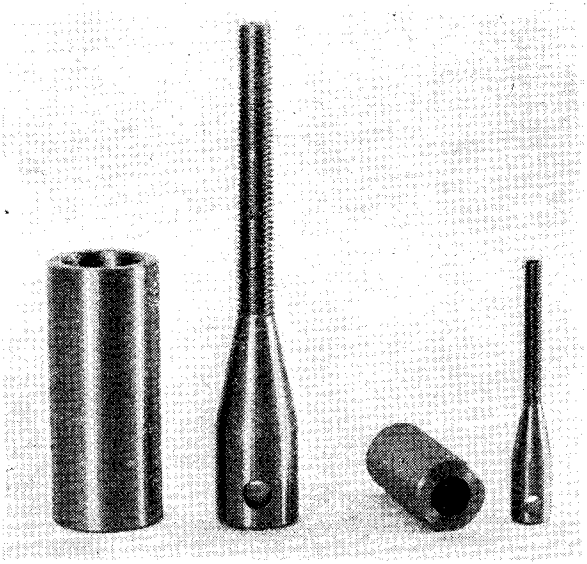


Fig. 3. Showing the components of the two arbors

stock or with the work held in the bench vice. Machining the distance collars is a straightforward drilling and turning operation.

An Adaptable Arbor

In order to machine the rough edge of a washer and, at the same setting, to form a well-finished chamfer, a single washer can be mounted on an arbor of the type illustrated in Fig. 2, which will hold washers of several sizes. It will be seen that the washer is clamped against a flat register face, and is also centred by means of a conical clamping-screw. Should the washer turn under the pressure of the cut, the clamping-screw will tend to tighten and so give a secure drive. If the central screw is made of ordinary mild-steel, it may become ringed by the pressure of the sharp edge of the washer bore; to prevent this, the clamping-screw should be made of silver-steel. Attempts to harden, or case-harden, the screw are, perhaps, best avoided, as this may cause distortion of the rather slender shank. To enable the edge of the washer to be machined more easily, the end of the carrier may be heavily chamfered to correspond with the smallest size of washer mounted. Several arbors may be required if washers of widely differing sizes have to be machined, but two of these should suffice for machining washers with bores ranging from $\frac{1}{8}$ in. to $\frac{1}{2}$ in.; the smaller will hold $\frac{1}{8}$ in. to $\frac{1}{4}$ in. washers, and the larger $\frac{1}{4}$ in. to $\frac{1}{2}$ in.

To make the smaller arbor, a short length of $\frac{1}{2}$ in. dia., turned, mild-steel rod is gripped in the chuck and the position of No. 1 jaw is marked with a centre punch. After the end has been faced, the rod is drilled right through with a No. 40 drill to the tapping size for $\frac{1}{8}$ in. Whitworth, or the hole can be tapped No. 5 B.A. when made with a No. 38 drill. But before being tapped, the bore should be counter-drilled 9/32-in. to a depth of $\frac{3}{8}$ in. to form a clearance for the head of the clamp-screw.

The tapping operation will be more easily carried out if the work is reversed in the chuck and the tapping hole is opened out to $\frac{1}{8}$ in. dia. for a depth of $\frac{1}{4}$ in. A length of 9/32-in. dia. silver-steel is used for making the clamp-screw to the form shown in the working drawing.

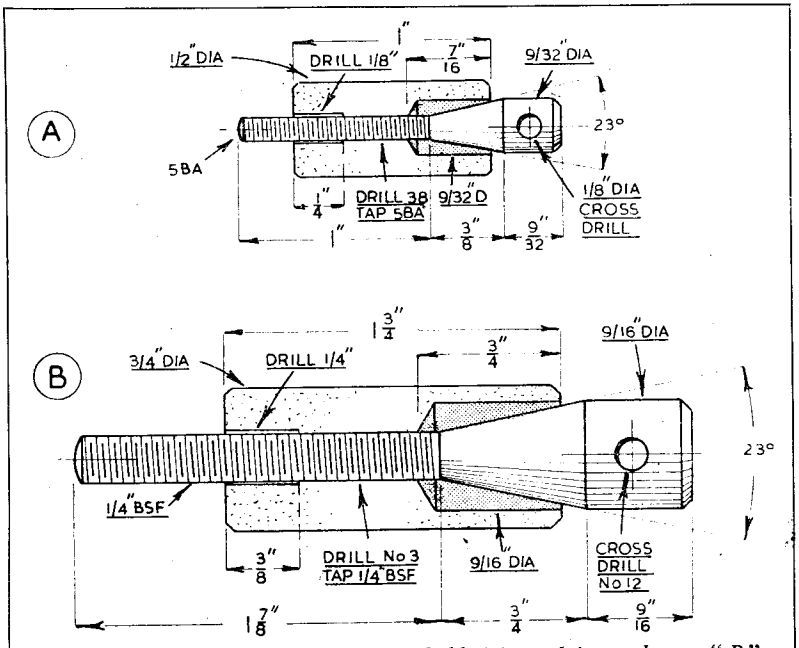


Fig. 4. Details of the arbors. "A"—holds $\frac{1}{8}$ in. to $\frac{1}{4}$ in. washers; "B"—$\frac{1}{4}$ in. to $\frac{1}{2}$ in. washers

The $\frac{1}{8}$ in. dia. shank is first turned to size and then threaded from the tailstock, and the taper is formed by setting over the top-slide to 11½ deg.

Before the screw is cut to length, the head should be cross-drilled to take a tommy-bar for clamping the washer in place.

For this purpose, it is advisable to employ a jig of the kind described in a previous article, for off-centre drilling will greatly mar the appearance of the finished work.

The larger arbor illustrated is machined, in the same way, to the dimensions given in the accompanying drawing.

Enlarging the Bore of Washers

When fitting washers, it may be found that the overall diameter is correct but the bore is too small ; for example, a standard, $\frac{1}{4}$ in. Whitworth washer is of the right diameter for a $\frac{5}{16}$-in. B.S.F. nut, and the bore must, therefore, be enlarged to $\frac{5}{16}$ in. clearing size if a washer of the right kind is not available.

To drill out the bore to the clearing size, the washer is gripped in the machine vice ; the small Myford vice will be found most convenient for this purpose, as the curved recess formed in the sliding jaw affords quite a secure grip with but light tightening of the clamp-screw. As the base of this vice has a clear way through, $\frac{3}{8}$ in. wide, drills up to $\frac{5}{16}$ in. dia. can safely be used when the washer rests centrally on the work face.

For larger drilling, however, the washer should rest on a parallel strip of wood to receive the drill as it breaks through.

The burr formed by the drill on the under side of the washer should be removed by reversing the work and lightly countersinking the bore with a 60-deg. cutter.

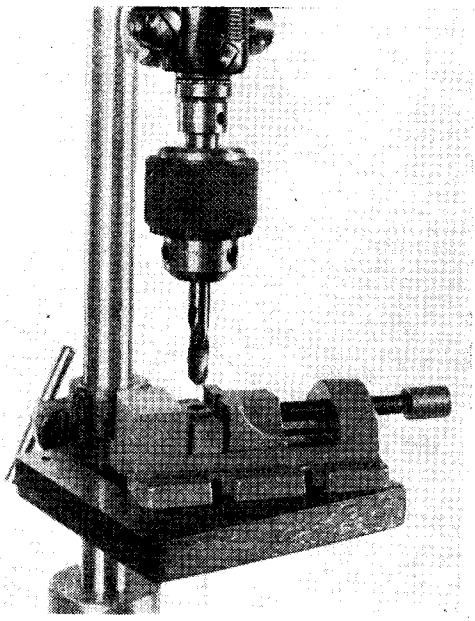


Fig. 5. Enlarging the bore of a washer

THE CLUB WORKSHOP

THE problem of equipping a club workshop is one which presents itself sooner or later to most model engineering societies, and our advice is sometimes sought on how to lay out available funds, which are often very limited, to the best advantage for this purpose. A great deal will, of course, depend on the circumstances of members, and the class of work which is predominant among them. In some cases, a very important object is to assist and encourage members who possess little in the way of tool equipment and workshop facilities, and this clearly calls for a complete range of small tools, plus one or more lathes, and possibly other machine tools, of a type and size in keeping with that of the average model workshop. This is usually the most expensive form of communal workshop to equip, and also to maintain. In the majority of clubs, where nearly all members have at least some basic equipment of their own, it is usually a good policy to devote most of the available funds to equipment of the kind which is outside the scope of the normal home workshop, such as a good rugged heavy lathe (not necessarily very accurate, but capable of dealing with the outsize jobs which everyone encounters at times), other machine tools of a similar class, brazing and welding equipment, or a forge. These items are often obtainable fairly cheaply through advertisements in the " M.E.," and will help members over many difficulties which may be found formidable or even impossible with normal home workshop equipment.

Having equipped the club workshop, another and often more serious problem is that of organising it to the best advantage of members. The complaint is often made that one or two members seem to monopolise the workshop, and others hardly ever get a look in. Both the amount of equipment and floor space may be found inadequate to serve the number of members who wish to use it. This clearly calls for judicious administration, and it is most essential to find a member who is able to devote time to taking charge of the workshop, and is both tactful and firm in dealing with those who use it. We have seen good equipment abused, tools lost or damaged, to the extent of ruining a worthy scheme which should have been an asset of inestimable value to the club concerned, for the lack of good management. All these points should be given the most careful consideration by the club before embarking on a venture which is bound to be expensive ; and if there is any doubt that it can be properly administered, it is by no means certain that this is the best possible end to which the hard-earned resources of the club should be devoted.

TWIN SISTERS

by J. I. Austen-Walton

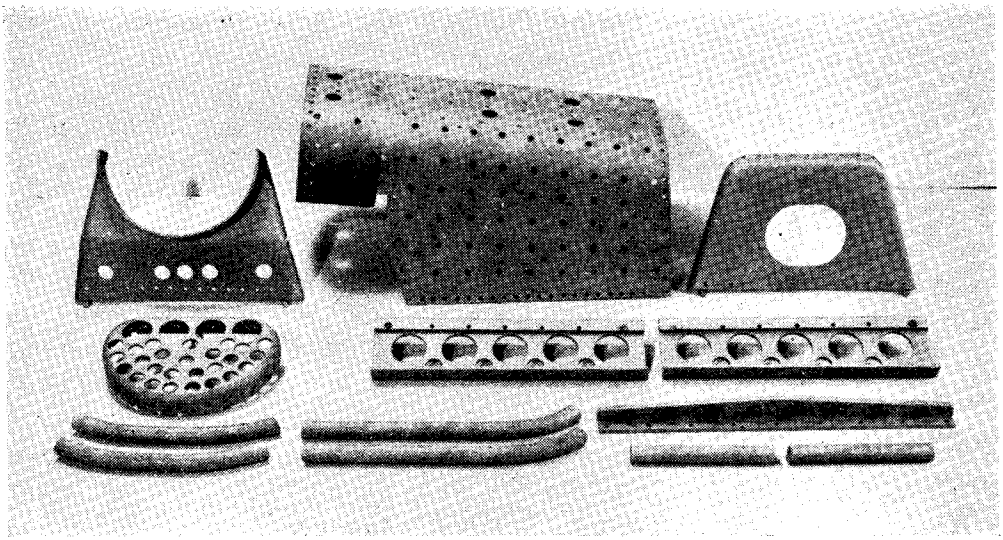
Two 5-in. gauge locomotives, exactly alike externally but very different internally

FIRST of all, my thanks to all those kind people who wrote to me during my recent and rather severe bout of illness. To many I wrote in reply, but I fear there are still some who were missed out—not intentionally, of course, but at a time when I was just incapable of dealing with anything at all.

This must not become a dissertation on health or illness—one hears enough about these things in the ordinary course of events, but I intend to make a vow—never again will I prophesy the future course of events in locomotive building, especially when it concerns a timetable.

I have been on my feet working, after a style, for some weeks now, and with a strict doctor's injunction "light duty only" made almost superfluous by having to wear a formidable contraption of steel, straps and plastic. I was told that this "heaven-sent" appliance might restrict movement to "some extent," and that proved to be correct. I was not satisfied with this ambiguous deterrent, and decided to test to the full, the exact amount of restriction it entailed. The making of a boiler seemed to suggest a rugged form of activity that might well coax each and every sluggish muscle, back into activity, and I was intrigued with the idea of at least partly hiding inside my own personal steel and plastic fortress during the "hot" processes.

"All will be well," I said, "unless the plastic parts melt, and become part of me"—another form of prophesy that very nearly came right; but at least a boiler emerged and in due course was tested, and over which I again prophesy many a storm will rage. I'm not worried in the least; its a *good* boiler—a much better boiler than I expected it to be, and if I had been completely fit and strong, I could not have produced a better job.



Boiler parts for Bill Cooper's "Twin Cousin"

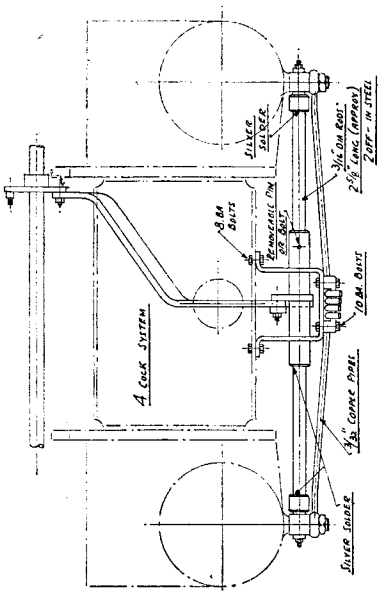
That simple act of faith, copper, oxy-acetylene, and partly melted plastic, put new life into me and a new enthusiasm for the poor neglected little "Sister." The job of making and fitting the cylinder drain cock system, seemed to be absolute child's play after this, and before long it was on and working.

I am still anxious to complete the few remaining chassis details before going over to the boiler and upper works, and decided to issue this drawing next. As promised some time ago, the two systems are shown, although it is not the first system I have used, but the second, to be published next. I have accumulated so much material in the form of photographs from abroad and shots of other "Twin Sisters" in the building, that I should be stocked for some time to come.

Even at this stage, I cannot resist telling you about the "Twin Cousin," now being built by

Continued from page 258, *Vol.* 106, "*M.E.*," *February* 21, 1952.

Bill Cooper, in Hamilton, Canada. He wrote to me many months ago, telling me that he was building a small switcher locomotive on lines very similar to those of the " Sisters," but with a proper Canadian look about her. It then appeared that he, too, was in the midst of " boiler agony," and along came shots of the boiler parts before assembly, and which are reproduced herewith.

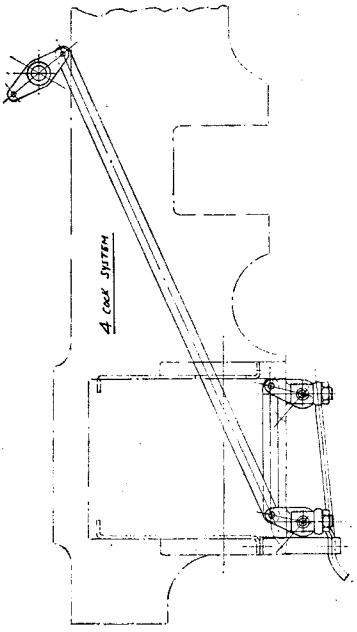


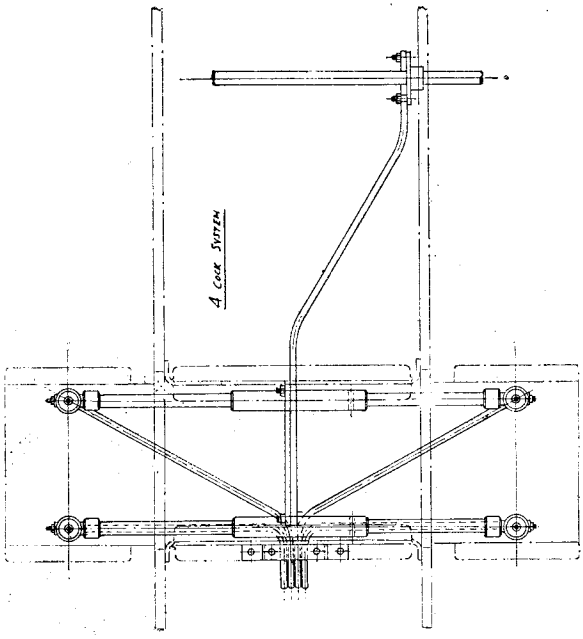
I think you will agree that it is an excellent job of work, with a degree of good, sound constructional detail that few builders would care to emulate. But even better news was to follow; Mr. Cooper let me know that the " hydrostatic " test had gone off well, and it looks like another good boiler getting ready for a spell of hard work in the near future.

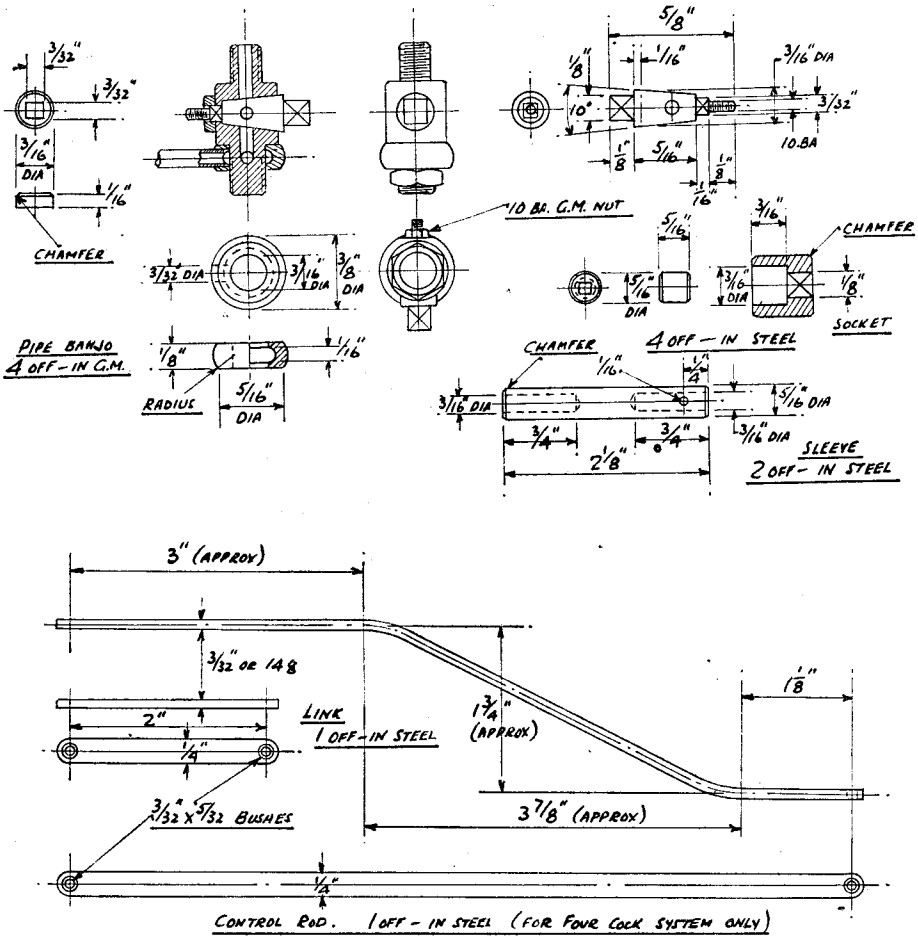
Cylinder Drain Cocks

Take a look at the first, or four-cock arrangement of cylinder drain cocks. Remember what I said about the downward projection below the cylinders? It would be practically impossible to reduce the actual valves any more, and still allow reasonable passages for the escape of steam and water, to say nothing of any surplus of heavy cylinder oil. I have nothing against the plug cocks themselves, especially if they are made to a taper of 10 deg., as shown. On this sort of job, sticking or binding is quite unheard of, even with the plugs screwed in tightly.

One of the secrets of success in making plug cocks, is to use dissimilar metals for the body and the plug, which fact should by now, be fairly common knowledge; reminder partnerships being in the order of say, brass with phosphor-bronze, brass with gunmetal, gunmetal with phosphor-bronze, but no aluminium alloy at any price, in conjunction with any other metal. I have been let down by so many of the aluminium alloys, from the humble rivet to quite serious parts, that I exclude this metal from locomotives altogether. Another very important point to watch with the making of plug cocks, is the fit of the little washer with the square hole in it,







which, with the nut, locks the plug portion into the body, and generally provides the adjustment for fit. Unless this square hole really *fits* the plug portion, the turning of the valve will either loosen or tighten the plug in the body, as the nut is " edged " round one way or another. A plug cock that is forever working loose, encourages dirt and grit to get in between the working surfaces, and leakages start ; but cocks that tend to tighten up, soon reach a stage where they cannot be moved at all. Only small points perhaps, but still very important.

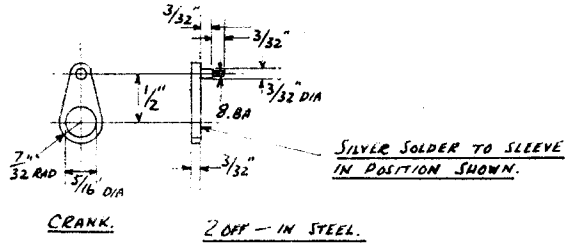
Assuming that you make up the plug cocks first, you will have to make a taper " D "-bit in the usual way, taking care that the turned surface is perfectly smooth and free from " rings " before halving. It is then a good idea to take a small piece of rod of the same material to be used for the cock bodies. Try out the " D "-bit on this, and if the taper bore is smooth and clean, the tool can be passed for further use. If the test-piece is parted off at a little less than the plug length, it can be used to hold the finished plugs while you machine or file the square heads ; holding a taper plug is difficult unless you adopt some such method.

Remember to leave the top slide setting on the lathe, in the same position for all taper turning until you have made the required number of parts. Usually, I turn up a number of extra plug blanks, and put these away in a tin, together with the " D "-bit made to suit the job ; in case of accidents, it is handy to be able to get one out of stock.

You will notice that all the cocks are operated by a pair of jointed rods running across the frames ; they have to be jointed so that you can get them on, without having to take off or loosen a cylinder unit one side. The rod ends carry little sockets with internal squares to fit the plug cock heads. It is an easy job filing out a through socket, compared with the job of drifting a square in a blind hole. I know they drift the sockets in Allen screws, but then they have special equipment to do it.

There need be no difficulties about " timing " all four valves to open and close together, regardless of how and where the sockets on the

rods happen to come. When you make the cocks, fit these to the cylinders without drilled steam ways, but mark the cock bodies for their positions on the cylinders, so that you may be able to take these out and replace them later in their right places. Now make up the rods with their pinned sleeves and sockets so that they will fit the valves, and operate them. Next, complete the linkage *between* the rods, and after further marking, dismantle the whole set of gear. Before removing the actual valves, tighten the plugs in the cock bodies by means of the small nut at the back, so that they cannot be moved at all. This holds everything tight and firm while you drill down the body of the cock from the inside or top entry of the valve. Owing to the use of

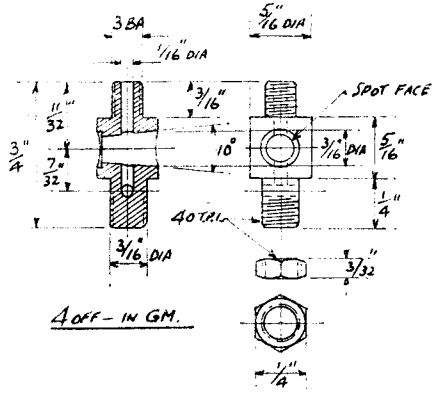


a banjo type of union, the hole must be blind, so that the hole drilled does not come right through the end; you have to drill a cross hole at a point about the middle of the banjo itself, to lead the escaping condensate through to the final pipe provided. In any case, it would be inadvisable to drill this passage with the valve in position because the drillings would get down into the cylinder, and cause serious damage somewhere. Once the drilling operation is over, the valves may be replaced, and the rest of the gear reinstated. Remember to loosen the plug nuts before testing out.

There is no hard-and-fast rule as to the position of the handle in the cab for "open" or "close," at least, not in the small version, but I prefer and have always used the "forward open" for some reason. Perhaps a little later on I will give a sketch of a simple spring-loaded, automatic valve, mainly for the benefit of "Minor" builders; but the part in question is so very simple that some folk may decide to work out something for themselves.

The final, or rather, semi-final rod that runs up to the double crank on the weighshaft, is shown in approximate length and setting. When I made this up, it did not look in the least like the drawing, but that does not matter, even with its terrific offset, its duty is so very light that a bent hairpin would almost be strong enough. I found that I had added some small oil piping inside the frames, and a sort of double cranking had to be effected before I got complete clearance throughout the range of movement.

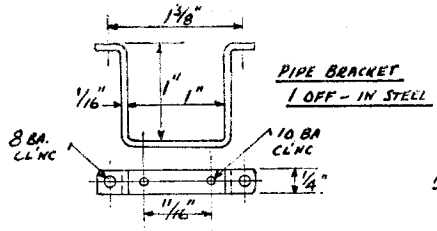
And there I think we will leave the drain cock question until I give the mastercock system in the next instalment.

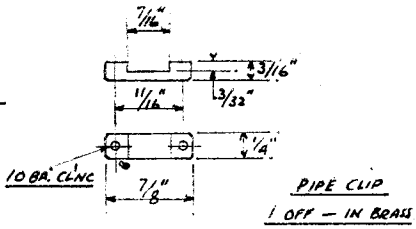


Small Oil Pipes

Readers who are building the engine will be well aware of certain provisions on the axle boxes and horn cheeks, for oil pipes, and probably cursed me at the same time. I have fitted these pipes—each and every one of them, and I refuse to attempt to draw the entire outfit. But here is a description of the layout, and with a little care and patience you should be able to get it all fixed up.

On each side of the frames, at a position just forward of the motion bracket, and sitting right on the top edge of the frames themselves, is a small brass oil box with a sloping hinged lid;



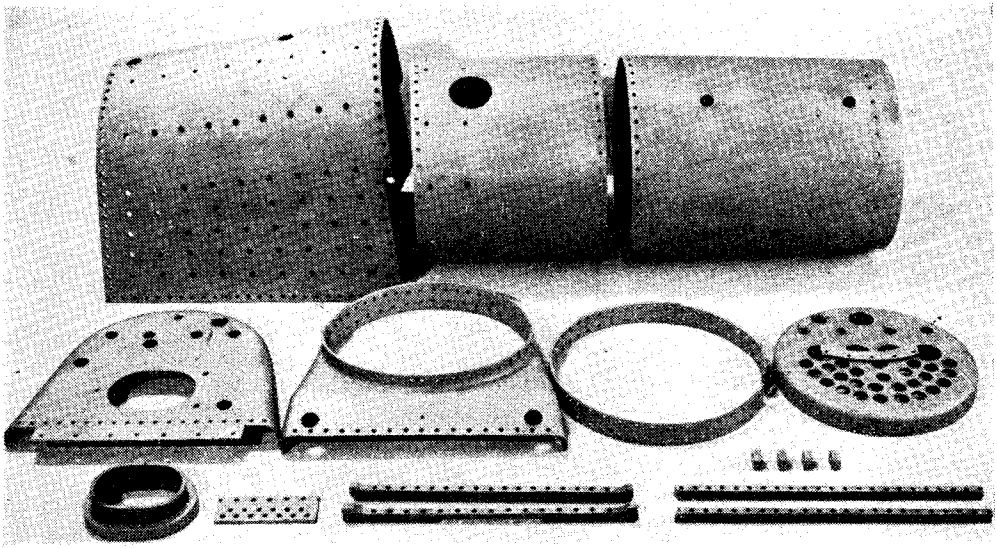


to be exact, there are *two* of these boxes, about ¼ in. apart, so the work-shy types might prefer to make it just one box.

Thinking in terms of two boxes for the moment, the first or front box carries three pipes arranged so that they come away *outside* the frames. The first pipe at the front, ⅛ in. diameter copper, takes a graceful bend down, and runs along to drip conveniently over the valve-rod. I fitted a tiny stay to the valve spindle gland itself—just a small tab of brass silver-soldered to the gland face, and a hole drilled through it to take the pipe; otherwise, this is rather a long and winding pipe without support, and liable to get

bent when cleaning. The second pipe may be slightly larger, 3/32 in. would do (there *are* sizes made between $\frac{1}{16}$ in. and 3/32 in.) and this takes a short run across and down to drip or actually fit into the hole specified in the top of the valve guide block fitting ; if fitted in this way, it needs no support. The third pipe, again 3/32 in. diameter, turns out and down to a hole drilled in about the middle of the top guide bar. To

even if I lived to be over a hundred years old. I swallowed the bait and got some of the tubing. It certainly looked the part, and was about the right scale size. I boiled it in oil ; I boiled it in water ; I pulled it here and there and most obligingly it went back into shape ; I blew steam through it and it just smiled back at me—Eureka, except for a strange plastic taste from the vegetable saucepan for about three days.



Bill Cooper's detail work and workmanship is above the average

add to the appearance, I fitted a tiny hexagon dummy nut to the pipe at a point where it joined the guide bar ; a tiny scrap of hex. material, drilled through and silver-soldered (or soft-soldered) to the pipe, is quite sufficient. The first pipe from the second box is brought out of the box to go down inside the frames, as are the remaining two pipes. This goes to fit the hole in the forward horn cheek, 3/32 in. diameter. The next pipe turns inwards and downwards for just a little way, to terminate in a suitable union—here I will digress for a moment to tell you what happened in my case.

Who Mentioned Plastics ?

On looking up the prototype details, I discovered that the centre pipe of the latter oil box did indeed go for a little way as a fixed pipe, terminating in a union ; but from there on it became a flexible, armoured, high pressure pipe. It had to be flexible to allow for the bobbing up and down of the axlebox, and I had painful visions of scouring the world for the same type of hose in 1-in. scale.

And now I cannot remember who it was who suggested that I tried a special brand of plastic tubing, for which it was claimed that oil, steam, water, heat, cold, acid, alkali, beer, harmonium chloride, and a number of other substances, could in no way affect its strength and pliability,

And so I made up some unions—very clever little unions with metal parts that went inside as well as outside the pipe, and so gave excellent support and gentle grip everywhere. I fitted the little pipes with their little unions, and the pipes plied as they should ; the axleboxes went up and down as they should, and I went to bed happy. Things remained happy for about three days, and then I found all the pipes broken off, near the unions, and after even more days, during which the pipes got shorter and shorter with each refitting of the little unions, and my temper got much shorter and shorter, only much more quickly, until everything got so very short that quite a number of little bits of plastic pipe went into the dustbin, and a set of little unions went into a tin as a horrible example to others.

I have now fitted long copper pipes that leave the fixed unions on the oil boxes, take gentle sweeps down, round and under the axle, returning to the union on the top of the axlebox ; this works just as well as the plastic pipe did in its heyday, but looks like doing it for a great deal longer, and without undue strain on the pipe or anything else.

And now, going on or back along the engine, there is (or will be) another oil-box on the front of each side tank, but as these have not yet been described, it is not much use telling you the

exact position. These will have three pipes leading from each, to feed the driving and trailing axles and horn cheeks.

Another Omission

An omission of mine, as usual. I have had many photographs of nearly completed chassis, and not one has yet fitted lagging sheet to the cylinders, probably for want of gen.

It is merely a single sheet, wrapped round from the cylinder edge, close to the frames, and up to the very top of the steam-chest. Fixing is by means of a couple of 10-B.A. hex. set-bolts, top and bottom. The top edge is enhanced if it is capped with a strip of metal about $\frac{1}{8}$ in. wide by 20-gauge brass. Lagging material could be Russian iron (if you can get it), hard rolled bronze, or thin stainless-steel ; 24-gauge, or thereabouts would be quite thick enough. Finish, plain black over the lot ; there is *no lining* on this engine anywhere.

(*To be continued*)

PRACTICAL LETTERS

Old Steam Engines

DEAR SIR,—Readers interested in old Cornish beam pumping engines will be extremely grateful to Mr. Ian Bradley and his photographer colleague, Mr. H. H. Dennis, for the exceptionally interesting article " The Crofton Beam Engines."

It would seem that doubts exist as to whether the No. 1 or Watt engine is single-acting or double-acting.

If the piston of the engine is coupled to the beam through the medium of a parallel-motion linkage, it does not signify that the engine is double-acting in the accepted sense of the term. Actually, the parallel-motion ensures smoother working of the parts, and, of course, is capable of transmitting thrust in both directions. It is true that Watt early on did use plate link chains for connecting the piston-rod to the wooden beam, but subsequently he introduced the parallel-motion, or linkage to ensure straight-line movement of the piston-rod.

Indeed, the success of the Watt double-acting rotative engine depended on the elegant parallel-motion.

In a double-acting steam engine, " live " steam is admitted alternatively to both sides of the piston, whereas in overhead beam pumping engines, live steam is admitted to the upper side of the piston only.

Consequently, engines working on this principle are regarded as being " single-acting."

Close scrutiny of the photographs supplementing Mr. Bradley's article, as well as others in my possession of the engine, would suggest that the latter is a typical single-acting Cornish engine.

The valve-gear appears to be of the tappet type as developed by Richard Trevithick and other eminent Cornish engineers.

It will be noted that the governor or regulator, steam and equilibrium valves, are in the top valve-chest or nozzle box. The exhaust valve is housed in the bottom valve-chest ; presumably, all valves are of the double-beat equilibrium type.

Again, three horizontal arbors mounted in a framework are used for operating the steam, equilibrium and exhaust valves.

The arbors are equipped with curved handles ; the one on the steam valve arbor being the " horn " ; bent arms on the arbors engage with the tappets (clamps) attached to the plug-rods moving up and down with the beam. The number of strokes made per minute is controlled by a " cataract " governing device, which lifts a catch to release a quadrant keyed to a weighted shaft, the latter in turn being interconnected to the steam valve by a long rod.

Unfortunately space will not permit of a detailed explanation of the working of a Cornish engine.

It may be of general interest to state that at least one pair of Cornish pumping engines is still at work in the Rugeley district of Staffordshire. The engines were made in 1877 by James Watt & Co., Birmingham.

During the past 45 years the writer has undertaken considerable research in connection with old locomotives, stationary and marine engines, resulting in the collection of a mass of notes and sketches, and which perhaps one day may be sorted for publication.

But up to the present I have not seen or heard of any non-rotative overhead beam pumping engines in which live steam acted alternately on the sides of the piston ; any information on the subject would be welcomed.

The model described by Mr. F. P. Lewis in THE MODEL ENGINEER of June 21st, 1951, is known as a return-connecting-rod engine, and the idea has been fully exploited in situations where the overall length of the engine had to be considered.

The arrangement of the ports is much the same as that adopted for the " table " engine, except that the latter was set vertically for space reasons. The writer remembers an interesting example of return-connecting-rod engine of large size, designed for erection on a large Australian mine for the purpose of supplying compressed air.

The engine was of the cross-compound type, steam and air cylinders being arranged tandem fashion with a common piston-rod passing through each pair of cylinders.

The H.P. steam cylinder and second air stage cylinder were connected by a rod to an overhung crank ; the L.P. steam and first stage cylinders were similarly arranged, and drove on to another crank set at 90 deg. to the first crank.

A large flywheel centrally mounted on the shaft between the cranks ensured steady running.

Slide valves fitted with Meyer variable expan-

sion cut-off gear were all operated by a system of shafts and bell crank levers ; movement of the levers being effected by eccentrics on the crankshaft.

At one time this particular design of machine was produced for an Australian firm for general purposes.

The series of articles entitled " Talking About Steam——" by Mr. W. J. Hughes, are most interesting, and should prove instructive to young engineers possessing only internal combustion engine experience, but interested in engines of former days.

Yours faithfully,
Cannock. H. R. LANGMAN

Camera Design

DEAR SIR,—I should like to thank Mr. Widdas for pointing out the error in my article on February 14th ; the diagram in question was intended to show the optical paths only, and the lenses were a conventional representation of the three apertures ; on re-reading my article, however, I realise that a misleading impression has been given.

I was most interested to see that someone else is engaged in making a rangefinder, and in connection with the second point in Mr. Widdas's letter I fully agree with the necessity for dimming the direct image. I feel, however, that the easiest method is simply to use the yellow filter on the primary image, as the tint is not worrying even when the direct image is used for viewfinding.

Perhaps Mr. Widdas has by now seen my later article on a rangefinder which offers an alternative method of increasing the brightness of the reflected image. I am currently engaged upon adding a lens system to my rangefinder and by a coincidence the lenses chosen agree almost exactly with those detailed by your correspondent. I should like to stress, however, that the addition of an " inverted " telescope to the rangefinder does not affect its principle or the accuracy of results obtained, but it does facilitate view-finding by the same instrument, and since the apertures must be closed somehow, manufacturers find it virtually as cheap to incorporate lenses. The amateur may have to go to some trouble and expense to obtain suitable lenses, however, and for this reason none were mentioned in my article of July 3rd and 10th.

Yours faithfully,
Pinner. RAYMOND F. STOCK.

CLUB ANNOUNCEMENTS

The Tees-side Society of Model and Experimental Engineers

At a meeting held on Tuesday, July 22nd, the chairman, Dr. W. H. Maclennan, was the speaker and his subject was the testing of model locomotives. He particularly referred to the tests taken at the Stephenson Memorial Trials held in recent years and in which the departure from what proved to be the average performance was very marked even in the case of locomotives of similar class, gauge and design.

Dr. Maclennan demonstrated by a sample of fuel 1 oz. in weight and by samples of water, just how much water could be evaporated if all the energy in the fuel could be utilised, how much was likely to be evaporated at an average working efficiency and the amount of water which could be regarded as the equivalent proportion of the energy available at the draw-bar of a model locomotive of the highest efficiency obtainable in practice.

He stressed the importance of the Stephenson Memorial Trials to be held at the Albert Park, Middlesbrough, on July 26th, and suggested that full particulars of each locomotive tested should be submitted in order that the possible causes of the discrepancies in performances could be examined so that the performances might be improved in the future.

Hon. Secretary : J. W. CARTER, 28, East Avenue, Billingham, Co. Durham.

Lymington and District Model and Engineering Society

We are holding our annual model engineering exhibition at the Community Centre, New Street, Lymington, from Wednesday, August 27th until Saturday, the 30th. Open 2 p.m. until 9 p.m. Wednesday, Thursday and Friday, Saturday 11 a.m. until 9 p.m. The club passenger-carrying railway will run on Thursday and Friday evenings and all day on Saturday.

Hon. Secretary : T. G. CRABBE, " Hurst Cottage," Wainsford Road, Pennington, Lymington.

The Isle of Wight Model Engineering Society

This society will be holding its annual exhibition at the Vectis Hall, Ryde, I.W., from Saturday, August 23rd to August 30th. We will be pleased to welcome all model engineers who may be on holiday in our garden isle during that period, and also any models or bits and pieces they might care to bring along. The hall is quite close to the front and the Esplanade Station.

Our portable track and locomotives have now started the season, operating in various parts of the island and will be on active service at the exhibition along with other interesting features. Particulars of the exhibition may be obtained from the Hon. Secretary : V. C. RICHARDS, " Pan Y Lan," Park Road, Wootton, I.W.

The Wallasey Model Power Boat and Yacht Club

An open regatta will be held on Sunday, August 17th, 1952, in Central Park, Wallasey. The regatta will commence at 11 a.m. and there will be " A," " B," " C " and " D " class hydroplanes, and steering and nomination events.

A cordial invitation is extended to all clubs to attend.

I would appreciate a post card from intending competitors stating the events they intend entering. Light refreshments will be available at the club's boathouse.

Hon. Secretary : H. A. JACKSON, 21, Deveraux Drive, Wallasey.

Welling and District M.E.S.

The future fixtures of the above society are as follows :—
August 22nd. Informal meeting. Welling Library.
August 31st. M.P.B.A. Grand Regatta, Victoria Park.
September 5th. " Bits and Pieces " Night.
September 14th. Kingsmere Regatta, Putney.
September 19th. Discussion on locomotive design.
September 21st. Southend Regatta. The society has hired a coach for this event, and there are still some seats going spare. First come, first served. Cash in advance. Apply Secretary, J. A. KING, 309, Days Lane, Sidcup, Kent. Bexley Heath 5872.

Perranporth and District Model Engineering Society

The above society are holding their annual exhibition in the Market Hall, Redruth, on August 30th, to September 6th, both dates inclusive. Further particulars may be obtained from the Exhibition Secretary, F. HARVEY, " Veronica," Perranporth.

Hon. Secretary : W. J. BAKER, St. Pirans Road, Perranporth. Telephone 3243.

York City and District Society of Model Engineers

The next meeting at Railway Street will be on August 16th, 1952, at 7 p.m., and the presence of all members is requested.

The track at Bishopthorpe will be open to the public on Sunday, August 17th, from 3 p.m.

Hon. Secretary : W. SHEARMAN, 28, Terry Street, York.